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Report on the individual review of the annual submission of Spain submitted in 2017*

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual greenhouse gas (GHG) inventory covering emissions and removals of GHG emissions for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention. This report presents the results of the individual inventory review of the 2017 annual submission of Spain, conducted by an expert review team in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol". The review took place from 18 to 23 September 2017 in Madrid, Spain.

* In the symbol for this document, 2017 refers to the year in which the inventory was submitted, not to the year of publication.

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Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AAU	assigned amount unit
AD	activity data
Annex A sources	source categories included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
Article 8 review guidelines	"Guidelines for review under Article 8 of the Kyoto Protocol"
AWMS	animal waste management systems
B_0	maximum methane-producing capacity of manure
C	confidential
CER	certified emission reduction
CH_4	methane
CM	cropland management
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU ETS	European Union Emissions Trading System
FAO	Food and Agriculture Organization of the United Nations
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
$Frac_{LEACH-(H)}$	fraction of nitrogen input to managed soils that is lost through leaching and run-off
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance for LULUCF	*Good Practice Guidance for Land Use, Land-Use Change and Forestry*
IPPU	industrial processes and product use
KP-LULUCF activities	LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
kt	kilotonne
LPG	liquefied petroleum gas
LULUCF	land use, land-use change and forestry
MCF	methane conversion factor
MMS	manure management systems
Mt	million metric tonnes
N	nitrogen
NA	not applicable

NE	not estimated
NF_3	nitrogen trifluoride
NFI	national forest inventory
NIR	national inventory report
NO	not occurring
N_2O	nitrous oxide
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
UNFCCC	United Nations Framework Convention on Climate Change
UNFCCC Annex I inventory reporting guidelines	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
UNFCCC review guidelines	"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention"
WDR	wetland drainage and rewetting
Wetlands Supplement	*2013 Supplement to the 2006 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories: Wetlands*

I. Introduction[1]

1. This report covers the review of the 2017 annual submission of Spain organized by the secretariat, in accordance with the Article 8 review guidelines (decision 22/CMP.1, as revised by decision 4/CMP.11). In accordance with the Article 8 review guidelines, this review process also encompasses the review under the Convention as described in the UNFCCC review guidelines, particularly in part III thereof, namely the "UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention" (decision 13/CP.20). The review took place from 18 to 23 September 2017 in Madrid, Spain, and was coordinated by Ms. Barbara Muik (secretariat). Table 1 provides information on the composition of the ERT that conducted the review of Spain.

Table 1
Composition of the expert review team that conducted the review of Spain

Area of expertise	*Name*	*Party*
Generalist	Mr. Mauro Meirelles de Oliveira Santos	Brazil
Energy	Ms. Laetitia Nicco	France
IPPU	Mr. Alexander Valencia	Colombia
Agriculture	Mr. Jorge Lam Alvarez	Peru
LULUCF	Ms. Ana Blondel	Canada
Waste	Ms. Mayra Rocha	Brazil
Lead reviewers	Ms. Blondel	
	Mr. Santos	

2. The basis of the findings in this report is the assessment by the ERT of the consistency of the Party's 2017 annual submission with the Article 8 review guidelines. The ERT has made recommendations that Spain resolve the findings related to issues,[2] including issues designated as problems.[3] Other findings, and, if applicable, the encouragements of the ERT to Spain to resolve them, are also included.

3. A draft version of this report was communicated to the Government of Spain, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

4. Annex I shows annual GHG emissions for Spain, including totals excluding and including the LULUCF sector, indirect CO_2 emissions and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from KP-LULUCF activities, if elected, by gas, sector and activity for Spain.

5. Information to be included in the compilation and accounting database can be found in annex II.

[1] At the time of publication of this report, Spain had submitted its instrument of ratification of the Doha Amendment; however, the amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, paragraph 6, pending the entry into force of the amendment.

[2] Issues are defined in decision 13/CP.20, annex, paragraph 81.

[3] Problems are defined in decision 22/CMP.1, annex, paragraphs 68 and 69, as revised by decision 4/CMP.11.

II. Summary and general assessment of the 2017 annual submission

6. Table 2 provides the assessment by the ERT of the annual submission with respect to the tasks undertaken during the review. Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.

Table 2
Summary of review results and general assessment of the inventory of Spain

Assessment			*Issue or problem ID#(s) in table 3 and or 5[a]*
Dates of submission	Original submission: 12 April 2017 (NIR), 12 April 2017, Version 7 (CRF tables), 12 April 2017 (SEF-CP2-2016), 23 May 2017 (SEF-CP1-2017) Revised submission: 26 June 2017 (NIR), 23 May 2017 (SEF-CP2-2016) Unless otherwise specified, the values from the latest submission are used in this report		
Review format	In-country		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	1. Have any issues been identified in the following areas:		
	(a) Identification of key categories	Yes	G.3, I.23
	(b) Selection and use of methodologies and assumptions	Yes	E.13, I.24, I.29, A.21, A.24, L.1, W.2
	(c) Development and selection of EFs	Yes	E.14, W.1, W.6
	(d) Collection and selection of AD	Yes	E.16, E.19, I.29, I.30, A.20, L.3, W.2, W.8
	(e) Reporting of recalculations	Yes	I.21, A.17
	(f) Reporting of a consistent time series	Yes	E.13, I.16, W.8
	(g) Reporting of uncertainties, including methodologies	Yes	L.9
	(h) QA/QC	QA/QC procedures were assessed in the context of the national system (see para. 2 in this table)	
	(i) Missing categories/completeness[b]	Yes	L.11, L.13, L.14, L.15, KL.13
	(j) Application of corrections to the inventory	No	
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	Yes	I.28, KL.12
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	No	E.17, E.19, I.18, L.5, L.10, KL.8

Assessment			*Issue or problem ID[a](s) in table 3 and or 5[b]*
Supplementary information under the Kyoto Protocol	2. Have any issues been identified related to the national system:		
	(a) The overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements	No	
	(b) Performance of the national system functions	No	
	3. Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry	No	
	(b) Performance of the functions of the national registry and the technical standards for data exchange	Yes	G.6
	4. Have any issues been identified related to reporting of information on ERUs, CERs, AAUs and RMUs and on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, taking into consideration any findings or recommendations contained in the SIAR?	No	
	5. Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, including any changes since the previous annual submission?	No	
	6. Have any issues been identified related to the reporting of LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as follows:		
	(a) Reporting requirements in decision 2/CMP.8, annex II, paragraphs 1–5	Yes	KL.2, KL.7
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14	Yes	KL.4
	(c) Reporting requirements of decision 6/CMP.9	Yes	KL.6, KL.9
	(d) Country-specific information to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34	NA	
CPR	Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18?	Yes	
Adjustments	Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	No	

Assessment			*Issue or problem ID(s) in table 3 and or 5*[a]
	Did the Party submit a revised estimate to replace a previously applied adjustment?	NA	Spain does not have a previously applied adjustment
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?	Yes	
Recommendation for an exceptional in-country review	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review?	No	
Questions of implementation	Did the ERT list a question of implementation?	No	

[a] The ERT identified additional issues and/or problems in the energy, IPPU, agriculture, LULUCF and waste sectors, for KP-LULUCF activities, and of a general nature that are not listed in this table but are included in table 3 and/or 5.

[b] Missing categories for which methods are provided in the 2006 IPCC Guidelines may affect completeness and are listed in annex III.

III. Status of implementation of issues and/or problems raised in the previous review report

7. Table 3 compiles all the recommendations made in previous review reports that were included in the previous review report, published on 14 July 2017.[4] For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2017 annual submission and provided the rationale for its determination, which takes into consideration the publication date of the previous review report and national circumstances.

Table 3
Status of implementation of issues and/or problems raised in the previous review report of Spain

ID#	*Issue and/or problem classification*[a]	*Recommendation made in previous review report*	*ERT assessment and rationale*
General			
G.1	Follow-up to previous reviews (G.4, 2016) (G.4, 2015) Transparency	Continue to address the transparency issues identified in the previous and current annual review report and provide information on the implementation of the recommendations on transparency in the NIR.	Addressing. Many issues related to transparency, including those to be addressed during this in-country review (see annex III to the previous review report) have been resolved: see ID#s E.6, E.7, E.9, I.1, I.2, I.3, I.4, I.5, I.6, I.14, A.5, A.6, A.7, A.9, A.10, A.11, A.12, A.14, A.15, W.4, W.5, W.9, W.10, KL.1 and KL.2. Others issues are being addressed: I.15, I.16, I.18, A.1, A.3 and KL.7.

[4] FCCC/ARR/2016/ESP.

ID#	*Issue and/or problem classification*[a]	*Recommendation made in previous review report*	*ERT assessment and rationale*
G.2	Inventory planning (G.5, 2016) (G.5, 2015) Adherence to the UNFCCC Annex I inventory reporting guidelines	Fully implement the 2006 IPCC Guidelines for all sectors of the inventory in a consistent manner, and report on progress in the NIR.	Resolved. The 2006 IPCC Guidelines have been implemented in this submission regarding all issues previously identified. See ID#s E.6, I.11, A.8, A.10, A.11, A.12, A.13, W.4, W.7, W.10 and W.11.
G.3	Key category analysis (G.6, 2016) (G.6, 2015) Comparability	Provide a justification for the level of category disaggregation used as well as the rationale when there is deviation from the level suggested in the 2006 IPCC Guidelines.	Not resolved. Spain did not justify in the NIR the use of the aggregate category 2.F or the disaggregation of category 2.A.4.
Energy			
E.1	1. General (energy sector) – all fuels (E.2, 2016) (E.2, 2015) (27, 2014) Transparency	Include the additional information provided during the review, containing disaggregated information on the EFs and plant-specific net calorific values, in the corresponding chapters of the NIR or include the address of the website where this information can be consulted.	Not resolved. The requested information was not provided in the NIR. During the review, Spain informed the ERT that it is developing a set of methodological documents that will be available on the Ministry of Agriculture and Fisheries, Food and Environment inventory website soon, and these are intended to contain the requested disaggregated information on the EFs and plant-specific net calorific values.
E.2	1.A.2 Manufacturing industries and construction – liquid fuels – CO_2, CH_4 and N_2O (E.10, 2016) (E.10, 2015) Adherence to the UNFCCC Annex I inventory reporting guidelines	Improve QA/QC procedures and include in the NIR the correct information in table 3.5.6.	Resolved. Table 3.5.6 of the NIR has been corrected, suggesting that QA/QC procedures have been improved.
E.3	1.A.3.a Domestic aviation – gaseous and liquid fuels – all gases (E.4, 2016) (E.4, 2015) (33, 2014) Comparability	Report the emissions from military aviation in the category mobile under other (fuel combustion) and exclude them from the category civil aviation, and explain any recalculation or reallocation.	Resolved. Military aviation emissions have been reallocated from category 1.A.3.a to category 1.A.5.b in the submission, and information on the reallocation is included in the NIR (sections 3.14.2 and 3.6.5).
E.4	1.A.3.a Domestic aviation – liquid fuels – CO_2, CH_4 and N_2O (E.11, 2016) (E.11, 2015) Transparency	Include in the NIR a qualitative assessment of aviation gasoline consumption.	Resolved. Owing to methodological changes and recalculations in category 1.A.3.a in the 2017 submission, the recommendation is no longer relevant. (AD are no longer identical for several years in the time series.)
E.5	1.A.3.b Road transportation – gaseous fuels – CO_2,	Provide in the NIR information on the assumptions used and estimates for gas consumption in road transportation for the	Not resolved. The requested information was not provided in the NIR. During the review, the Party informed the ERT that it

ID#	Issue and or problem classification[a]	Recommendation made in previous review report	ERT assessment and rationale
	CH_4 and N_2O (E.12, 2016) (E.12, 2015) Transparency	period 1997–2005.	has gathered new information on the gas vehicle fleet and is in the process of implementing a new calculation for estimating emissions from this category for the next submission for the period 1997–2005.
E.6	1.A.4 Other sectors – gaseous, solid and liquid fuels – CO_2 (E.13, 2016) (E.13, 2015) Accuracy	Continue work on implementing the 2006 IPCC Guidelines by applying the default CO_2 EF for the sector and reporting transparently on recalculations in the NIR.	Resolved. EFs for CO_2 have been updated in the inventory and are presented in the NIR (section 3.10.3). Recalculations have been transparently reported in the NIR (section 3.10.6).
E.7	1.B Fugitive emissions from fuels – gaseous fuels – CO_2 (E.14, 2016) (E.14, 2015) Transparency	Explain more clearly the results of the study on CH_4 recovery and flaring and how CH_4 recovery and flaring is treated in the estimates of fugitive emissions.	Resolved. Results from the study on CH_4 recovery and flaring, as well as an explanation of how CH_4 recovery and flaring is treated in the estimates of fugitive emissions, are included in the NIR (section 3.11.1).
E.8	1.B Fugitive emissions from fuels – gaseous fuels – CO_2 (E.14, 2016) (E.14, 2015) Transparency	Either provide a web link or submit the aforementioned study (see E.7 above) as an additional file to the next submission.	Not resolved. The institute that conducted the study (Asociación para la investigación y desarrollo de los recursos naturales (AITEMIN)) no longer exists, so a website address could not be included in the submission, but the study was provided by Spain to the ERT during the review. The ERT considers that Spain should indicate in the relevant section of the NIR that the study on CH_4 recovery and flaring can be provided on demand to future ERTs during the review.
E.9	1.B.2.c Venting and flaring – liquid fuels – CO_2 (E.15, 2016) (E.15, 2015) Transparency	Provide more information in the NIR on the methodology for estimating fugitive emissions for this category and include in the submission an overview of the methodologies used, including references for all subcategories within fugitive emissions from oil and gas.	Resolved. The information in the NIR (section 3.12.2) has been improved and the methodologies are in line with the 2006 IPCC Guidelines.
E.10	1.B.2.c Venting and flaring – gaseous fuels – CO_2 (E.16, 2016) (E.16, 2015) Accuracy	Enhance QA/QC procedures and correct in the NIR the calculations related to the CO_2 IEF for gas flaring.	Resolved. Spain recalculated CO_2 emissions from this category and the previously identified increase in the CO_2 IEF between 2013 and 2014 is no longer observed (see ID# E.19 in table 5).
IPPU			
I.1	2. General (IPPU) (I.1, 2016) (I.1, 2015) (40, 2014) (33, 2013) (69, 2012) (107, 2011) Transparency	In order to increase the transparency, consider providing more information in the NIR without violating confidentiality, including qualitative data.	Resolved. More information, including qualitative data, for this sector is provided in the NIR (section 4.4.2).

ID#	Issue and or problem classification[a]	Recommendation made in previous review report	ERT assessment and rationale
I.2	2. General (IPPU) (I.7, 2016) (I.7, 2015) Transparency	Provide more information on AD in the NIR, without violating confidentiality restrictions, by presenting AD in 100 base indexed on 1990 or AD trends as graphics without numbers.	Resolved. More information on AD in 100 base indexed on 1990 is provided in the NIR (section 4.6.1).
I.3	2.A.1 Cement production – CO_2 (I.2, 2016) (I.2, 2015) (41, 2014), (37, 2013) (68, 2012) Transparency	Provide in the NIR a qualitative assessment of the IEFs and include the information on cement kiln dust provided during the review.	Resolved. A qualitative assessment of the CO_2 IEFs, referencing technical documents and information on cement kiln dust are provided in the NIR (section 4.3.2).
I.4	2.A.1 Cement production – CO_2 (I.8, 2016) (I.8, 2015) Transparency	Include in the submission a full description of the methodology used to estimate CO_2 emissions from cement production.	Resolved. Transparency was improved through the provision of a better description of the methodology used to estimate CO_2 emissions and references to technical documents in which the methodology is explained in even more detail (section 4.3.2).
I.5	2.A.1 Cement production – CO_2 (I.9, 2016) (I.9, 2015) Transparency	Complete the description of the QA/QC procedures in the NIR with the information on QA/QC procedures provided during the review.	Resolved. A complete description of QA/QC procedures is included in the NIR (section 4.3.4).
I.6	2.A.2 Lime production – CO_2 (I.10, 2016) (I.10, 2015) Transparency	Include in the NIR information on the lower CO_2 IEF for lime production in 2011.	Resolved. Information on the lower CO_2 IEF for lime production in 2011 is included in the NIR (section 4.6.2).
I.7	2.A.3 Glass production – CO_2 2.C.5 Lead production – CO_2 (I.11, 2016) (I.11, 2015) Adherence to the UNFCCC Annex I inventory reporting guidelines	Improve QA/QC procedures and correct the reported values in CRF tables 2(I).A-Hs1 and 2(I).A-Hs2.	Resolved. Corrected values are reported in CRF tables 2(I).A-Hs1 and 2(I).A-Hs2, suggesting that QA/QC procedures have been improved.
I.8	2.A.4 Other process uses of carbonates – CO_2 (I.12, 2016) (I.12, 2015) Consistency	Include a detailed description of and justification for the trends in AD and the IEF.	Resolved. A detailed description of and justification for the trends in AD and the IEF, specifying brick and clay roof tile production, have been included in the reported AD, and are included in the NIR (section 4.10.2).
I.9	2.A.4 Other process uses of carbonates – CO_2 (I.13, 2016) (I.13, 2015) Adherence to the UNFCCC Annex I	Improve QA/QC procedures and correct the data on consumption of soda ash for other uses in CRF table 2(I).A-Hs1.	Resolved. Spain corrected the data on consumption of soda ash for other uses in CRF table 2(I).A-Hs1, suggesting that QA/QC procedures have been improved.

ID#	*Issue and or problem classification*[a]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	inventory reporting guidelines		
I.10	2.B.2 Nitric acid production – N_2O (I.14, 2016) (I.14, 2015) Adherence to the UNFCCC Annex I inventory reporting guidelines	Correct the units presented in NIR table 4.7.1.	Resolved. Spain corrected the units presented in NIR table 4.7.1.
I.11	2.B.2 Nitric acid production – N_2O (I.15, 2016) (I.15, 2015) Accuracy	Use the N_2O default process-specific EFs available in the 2006 IPCC Guidelines to estimate N_2O emissions from nitric acid production for the period 1990–2006.	Resolved. Spain used the N_2O default process-specific EFs available in the 2006 IPCC Guidelines to estimate N_2O emissions from nitric acid production for the period 1990–2007.
I.12	2.B.4 Caprolactam, glyoxal and glyoxylic acid production – N_2O (I.16, 2016) (I.16, 2015) Transparency	Include in the NIR the correlation analysis and the justification for the choice of the driver of the N_2O emissions from the production of caprolactam.	Resolved. Spain no longer estimates emissions for 1990–2000 based on an extrapolation of the AD for the period 2000–2013. Spain gathered AD directly from the only plant in the country producing caprolactam from 1990 to 1999 and used them to recalculate the N_2O emissions.
I.13	2.B.6 Titanium dioxide production – CO_2 (I.17, 2016) (I.17, 2015) Adherence to the UNFCCC Annex I inventory reporting guidelines	Improve the QA/QC procedures and report the correct CO_2 EF in the NIR.	Resolved. Spain no longer reports AD and emissions in CRF table 2(I)A-Hs1, but rather reports "C" for AD and "NA" for CO_2 emissions. The Party clarified that it uses the sulphate process for titanium dioxide production and verified that, according to the 2006 IPPC Guidelines, no emissions are produced during this process.
I.14	2.B.9 Fluorochemical production – HFCs (I.5, 2016) (I.5, 2015) (45, 2014) Transparency	Clarify, in the methodological description provided in the NIR, that measured HFC-23 emissions were used for the entire time series for two of the three plants and that the IPCC default EF for HFC-23 was used for only one plant, which closed after 1991.	Resolved. Clarification of the EFs used for the plants is included in the NIR (section 4.8.1).
I.15	2.B.9 Fluorochemical production – HFCs (I.6, 2016) (I.6, 2015) (45, 2014) Transparency	Consider whether it would be possible to publish the AD and HFC-23 EFs per plant, given that production at all plants has ceased.	Addressing. Spain has contacted the company that ran the plants regarding publication of AD and is awaiting a response.
I.16	2.B.9 Fluorochemical production – HFCs (I.18, 2016) (I.18, 2015)	Provide in the NIR the necessary explanations for time-series consistency.	Addressing. Spain provided in the NIR (section 4.8.2.1) a general explanation for the time-series consistency but did not provide an analysis of consistency between the use of the default EF for the period 1990–1998 and a plant-specific EF

ID#	Issue and or problem classification[a]	Recommendation made in previous review report	ERT assessment and rationale
	Transparency		for the period 1999–2011.
I.17	2.C.1 Iron and steel production – CO_2, CH_4 and N_2O (I.4, 2016) (I.4, 2015) (43, 2014) (42, 2013) Transparency	Consider how information on the coke production carbon balance and on all carbon balances related to steel-making processes could be included in the NIR without violating confidentiality.	Not resolved. Spain did not provide in the NIR information on the coke production carbon balance or on any other carbon balances related to steel-making processes (see ID# I.25 in table 5).
I.18	2.C.2 Ferroalloys production – CO_2 (I.19, 2016) (I.19, 2015) Transparency	Include in the NIR a detailed description of and justification for the emission trends.	Addressing. Spain included in the NIR (section 4.10.8) a description of the emission trends, but did not provide information on the share of each type of ferroalloy during the time series to explain these trends. (The Party had noted during the review of the 2016 annual submission that the decrease observed in the CO_2 IEF was mainly due to the change in the share of the production of ferrosilicon between the two plants producing this type of ferroalloy.)
I.19	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2 (I.20, 2016) (I.20, 2015) Adherence to the UNFCCC Annex I inventory reporting guidelines	Correct the reported value in CRF table 1.A(d) in accordance with paragraph 37(c) of the UNFCCC Annex I inventory reporting guidelines.	Resolved. Spain reports "NA" for bitumen in CRF table 1.A(d) for CO_2 emissions (columns I and J) consistent with the 2006 IPCC Guidelines and in accordance with paragraph 37(c) of the UNFCCC Annex I inventory reporting guidelines.
Agriculture			
A.1	3. General (agriculture) (A.1, 2016) (A.1, 2015) (51, 2014) (50, 2013) Transparency	Develop a summary table providing details of the references used in developing the country-specific methodologies and parameters used for the tier 2 approaches, and also provide a table detailing the main parameters used in the tier 2 methodologies.	Addressing. Spain included in the NIR a summary table for each category (pp.5.11, 5.17 and 5.31), but these tables contain insufficient information on the references used in developing the country-specific methodologies and the parameters used for the tier 2 approaches (e.g. method level used, research reports consulted, source of parameters used). In addition, EFs and parameters used are not included.
A.2	3. General (agriculture) – CO_2, CH_4 and N_2O (A.10, 2016) (A.10, 2015) Transparency	Update the agriculture chapter in the NIR and its annexes and include all of the methodological information required for reporting in accordance with the UNFCCC Annex I inventory reporting guidelines (para. 50), following the NIR outline described in the appendix of the guidelines.	Addressing. The agriculture chapter of the NIR has been updated and all necessary methodological information is included. Nevertheless, the NIR does not present descriptions, references and sources of information for the specific methodologies, including higher-tier methods and models, assumptions, EFs and AD, or the rationale for their selection, as required by the UNFCCC Annex I inventory reporting guidelines.

ID#	*Issue and or problem classification[a]*	*Recommendation made in previous review report*	*ERT assessment and rationale*
A.3	3.A Enteric fermentation – CH_4 (A.2, 2016) (A.2, 2015) (53, 2014) (53, 2013) Transparency	Incorporate in the NIR detailed explanations of the AD, assumptions, parameters and EFs used for the country-specific emission estimates in order to improve transparency.	Addressing. Spain commenced implementation of this recommendation for the 2017 submission, and the NIR (section 5.2.2) includes more details on methodological issues related to category 3.A (e.g. method level used, research reports consulted, source of parameters used); however, the EFs and parameters used are not included.
A.4	3.B Manure management (A.3, 2016) (A.3, 2015) (55, 2014) (56, 2013) Transparency	Provide explanatory information relating to AWMS in the NIR and in the documentation box to CRF table 4.B(b).	Not resolved. The NIR (section 5.3.2) does not include explanatory information relating to AWMS (now referred to as MMS) and CRF table 3.B includes information only on distribution of the MMS.
A.5	3.B Manure management – CH_4 (A.4, 2016) (A.4, 2015) (56, 2014) Transparency	Provide information with regard to the use of liquid AWMS for horses in Spain in the NIR.	Resolved. According to recent studies provided during the review (based on research into the alimentary balance of phosphorus and nitrogen in horses; see annex IV.B), liquid MMS for horses do not exist in Spain.
A.6	3.B Manure management – CH_4 (A.5, 2016) (A.5, 2015) (57, 2014) Transparency	Provide information with regard to the use of liquid AWMS for mules and asses in Spain in the NIR.	Resolved. As for ID# A.5, liquid MMS for mules and asses do not exist in Spain.
A.7	3.B Manure management – CH_4 (A.6, 2016) (A.6, 2015) (58, 2014) Transparency	Omit the AWMS "Other" from NIR table A3.2.3 to improve the transparency of the emission estimates.	Resolved. Spain made an effort to redistribute all existing MMS in the country to the MMS that appear in the CRF tables. Nevertheless, the Party identified some MMS as having unique conditions, which the ERT considers are correctly reported under "Other".
A.8	3.B Manure management – CH_4 and N_2O (A.11, 2016) (A.11, 2015) Transparency	Update the NIR with revised estimates and methodological descriptions of CH_4 and direct N_2O emissions from manure management for all animal categories estimated using MCF values and default EFs from the 2006 IPCC Guidelines, and update the NIR with the corresponding revised estimates and methodological description for indirect N_2O emissions from atmospheric deposition and leaching and run-off.	Resolved. The NIR has been updated with revised CH_4 and direct N_2O estimates, and section 5.3 includes further details on methodological issues related to category 3.B, including the provision of the MCF values and the choice of B_0 and MMS usage. The revised estimates for indirect N_2O emissions from atmospheric deposition and leaching and run-off are also documented in the NIR (p.5.24).
A.9	3.C Rice cultivation – CH_4 (A.9, 2016) (A.9, 2015) (63, 2014) (63, 2013) Transparency	Include a separate section in the NIR with complete information and documentation pertaining to the estimation of emissions from rice cultivation.	Resolved. The NIR includes a new section (5.7) with details on methodological issues related to category 3.C.

ID[a]	Issue and/or problem classification[a]	Recommendation made in previous review report	ERT assessment and rationale
A.10	3.D.a.2.a Animal manure applied to soils – N_2O (A.12, 2016) (A.12, 2015) Transparency	Update the NIR with revised estimates and methodological description of direct N_2O emissions from animal manure applied to soils, estimated with the revised amount of nitrogen available for application to managed soils using equation 10.34 from the 2006 IPCC Guidelines, and ensuring that the nitrogen amount reported is fully consistent with the nitrogen amounts in MMS.	Resolved. The NIR (section 5.4) includes revised estimates of, and an updated methodological description for, the estimation of N_2O emissions from animal manure applied to soils (category 3.D.a.2.a). The total amount of nitrogen input from animal manure applied to soils is equal to the total nitrogen excretion from MMS, as reported in CRF table 3.B(b).
A.11	3.D.a.3 Urine and dung deposited by grazing animals – N_2O (A.13, 2016) (A.13, 2015) Transparency	Update the NIR and the CRF tables with revised estimates and a methodological description of direct N_2O emissions from urine and dung deposited by grazing animals and indirect N_2O emissions from atmospheric deposition, estimated using the EFs from the 2006 IPCC Guidelines.	Resolved. The NIR (section 5.4) and CRF tables include revised estimates and an updated methodological description of direct N_2O emissions from urine and dung deposited by grazing animals (category 3.D.a.3).
A.12	3.D.b.1 Atmospheric deposition – N_2O (A.14, 2016) (A.14, 2015) Transparency	Update the NIR with revised estimates and a methodological description of indirect N_2O emissions from atmospheric deposition from managed soils, estimated using a tier 1 methodology and EFs from the 2006 IPCC Guidelines.	Resolved. The NIR (section 5.4) includes revised estimates of, and an updated methodological description for, the estimation of N_2O emissions from atmospheric deposition from managed soils (category 3.D.b.1).
A.13	3.D.b.2 Nitrogen leaching and run-off – N_2O (A.15, 2016) (A.15, 2015) Accuracy	Update the estimates for the category in the submission using data from the State Meteorological Agency to update the applied $Frac_{LEACH-(H)}$ in line with the methodology described in the 2006 IPCC Guidelines.	Resolved. Spain now estimates indirect N_2O emissions using a $Frac_{LEACH-(H)}$ with information from different regions of the country, provided by the State Meteorological Agency. The N_2O emission estimates have been revised and are transparently documented in the NIR (section 5.4.2, p.5.26, and section 6.12.2, p.6.102).
A.14	3.F Field burning of agricultural residues – CH_4 and N_2O (A.7, 2016) (A.7, 2015) (61, 2014) (62, 2013) Transparency	Include a separate section in the NIR with complete information on CH_4 and N_2O emissions from field burning of agricultural residues.	Resolved. The NIR contains a separate section (section 5.6 and table 5.6.2) that includes complete information on CH_4 and N_2O emissions from category 3.F. The ERT finds that methodological issues related to emissions from field burning of agricultural residues are sufficiently described in the NIR.
A.15	3.F Field burning of agricultural residues – CH_4 and N_2O (A.8, 2016) (A.8, 2015) (62, 2014) (62, 2013) (98, 2012) Transparency	Include in the NIR references to appropriate legislation governing the field burning of agricultural residues.	Resolved. The NIR (section 5.6 and annex 5.6.7) includes details on national legislation related to category 3.F.
A.16	3.F Field burning of agricultural residues –	Provide a detailed methodological description of the field burning of agricultural residues in the NIR, outlining	Resolved. The NIR (section 5.6 and table 5.6.2) includes a detailed description of the methodology applied and why it is

ID[a]	Issue and or problem classification[a]	Recommendation made in previous review report	ERT assessment and rationale
	CH_4 and N_2O (A.16, 2016) (A.16, 2015) Accuracy	the quantity of biomass burned for each crop, the parameters and the EFs.	most appropriate for Spain. Information on the quantity of biomass burned for each crop, and the parameters and EFs are also provided.
LULUCF			
L.1	4. General (LULUCF) (L.1, 2016) (L.1, 2015) (67, 2014) (68, 2013) (102, 2012) Accuracy	Explore the methods provided in chapter 5 of the IPCC good practice guidance for LULUCF in order to consider pre-1990 land uses and land-use changes in the reporting of GHG emissions/removals to improve the accuracy of the LULUCF sector inventory.	Not resolved. Information provided in the NIR and in response to questions raised by the ERT during the review indicates that Spain is at the initial phase of considering options to collect relevant AD.
L.2	4. General (LULUCF) (L.7, 2016) (L.7, 2015) Accuracy	Provide in the NIR an update on the ongoing and planned analyses to address the proper reflection for the assessment of land-use areas and their management in the period 1970–1990.	Not resolved. Relevant information was not provided in the NIR. During the review, Spain provided information on two projects to assess options for the assessment of land-use areas and their management in the period 1970–1990. One pilot project studied the cartographic data available for a single province in Spain; the results are being assessed. The other project is assessing the feasibility of producing new cartographic information for the country using data from the years 1956, 1986, 1997, 2003, 2009, 2012, 2015, based on a grid of 1 km × 1 km with 500,000 plots. Three additional options are being evaluated: (1) statistical extrapolation, as suggested by the 2006 IPCC Guidelines; (2) the tool Collect Earth from the FAO; and (3) the Full Lands Integration Tool from Moja Global, currently being tested by the European Commission. According to the Party, information on progress would be included in the next NIR.
L.3	4.C.1 Grassland remaining grassland – CO_2 (L.8, 2016) (L.8, 2015) Accuracy	Develop an approach to collect sufficient information on this category so as to be able to determine if it is a key category and therefore whether applying tier 1 methodologies to the dead organic matter and living biomass pools is appropriate.	Not resolved. Although progress has been made to produce preliminary estimates of carbon stock change from the soil pool in this land category (see L.11), no relevant progress has been made to determine whether the use of the tier 1 assumption is applicable to the biomass and dead organic matter pools, as recommended by the previous ERT.
Waste			
W.1	5.A Solid waste disposal on land – CH_4 (W.1, 2016) (W.1, 2015) (84, 2014) (91, 2013)	Improve the accuracy of the emission estimates by using more country-specific parameters for DOC, MCF and the methane generation rate constant.	Not resolved. Spain applied the 2006 IPCC Guidelines for estimating the emissions; however, it used default values for DOC, MCF and the methane generation rate constant.

ID[a]	Issue and or problem classification[a]	Recommendation made in previous review report	ERT assessment and rationale
	Accuracy		
W.2	5.A Solid waste disposal on land – CH_4 (W.3, 2016) (W.3, 2015) (87, 2014) (96, 2013) Accuracy	Continue the efforts to reduce the uncertainties of the AD and EFs.	Not resolved. No efforts to reduce the uncertainties of AD and EFs were identified in the NIR. During the review, Spain indicated that it is addressing this issue in collaboration with the national focal point for Spain (Subdirección General de Residuos) by improving data collection. However, the ERT noted that the same AD are being used for solid waste disposal and that the EFs are default values from the 2006 IPCC Guidelines.
W.3	5.A Solid waste disposal on land – CH_4 (W.6, 2016) (W.6, 2015) Transparency	Include in the submission the information on the assumptions and underlying sources for the estimation of the waste generation per capita rate, the fraction of waste deposited and the waste amount deposited per waste type on managed sites provided during the review.	Not resolved. The NIR does not include information on the waste amounts deposited per waste type on managed sites or information about the assumptions made to define the fraction of each waste type throughout the time series.
W.4	5.A Solid waste disposal on land – CH_4 (W.7, 2016) (W.7, 2015) Transparency	Update the NIR with revised estimates of CH_4 emissions and an updated description of the methodology from solid waste disposal on land, estimated using the methodology in the 2006 IPCC Guidelines.	Resolved. Spain provided estimates in accordance with the 2006 IPCC Guidelines and updated the description of the methodology implemented (NIR, p.7.13).
W.5	5.A Solid waste disposal on land – CH_4 (W.8, 2016) (W.8, 2015) Transparency	Update the methodological description regarding the use of the DOC default values from the 2006 IPCC Guidelines for the calculation of landfill gas generated.	Resolved. Spain updated in the NIR (p.7.14) the description of the methodology regarding the use of the DOC default values from the 2006 IPCC Guidelines.
W.6	5.A Solid waste disposal on land – CH_4 (W.8, 2016) (W.8, 2015) Accuracy	Continue efforts to develop country-specific parameters.	Not resolved. The Party continues to apply default values even though solid waste is a key category.
W.7	5.B. Biological treatment of solid waste – CH_4 and N_2O (W.9, 2016) (W.9, 2015) Accuracy	Provide revised estimates for categories 5.B.1 and 5.B.2, estimated using the EFs from the latest corrigenda for the 2006 IPCC Guidelines.	Resolved. Revised estimates, prepared using the updated EFs, are provided in the NIR (p.7.22) and CRF tables.
W.8	5.B.1 Composting – CH_4 and N_2O (W.11, 2016) (W.11, 2015) Accuracy	Investigate options to establish time-series consistency and recalculate historical emissions from composting accordingly, and check the values of the AD in 2013 and 2014.	Not resolved. Spain used the same AD as in the previous submission (until 2012, the whole volumes treated (i.e. entries into the composting facilities) were taken into account, whereas from 2013 onwards, material rejected in a pre-treatment process are subtracted from the entries).

ID#	*Issue and or problem classification*[a]	*Recommendation made in previous review report*	*ERT assessment and rationale*
W.9	5.D Wastewater treatment and discharge – CH_4 (W.4, 2016) (W.4, 2015) (89, 2014) (98, 2013) Transparency	Provide information in the NIR on the QA/QC procedures applied to ensure the quality of information, including information on how EFs are obtained and on the population covered by different treatment systems applied to both wastewater and sludge.	Resolved. Spain recalculated emissions from wastewater treatment and discharge (category 5.D) in the 2017 inventory, implemented the 2006 IPCC Guidelines and carried out new QA/QC procedures. The new information is in the NIR (sections 7.4.1.2, 7.4.2.2, and 7.4.4).
W.10	5.D.1 Domestic wastewater – CH_4 (W.12, 2016) (W.12, 2015) Transparency	Update the information in the NIR with the new data and parameters (new time series of historical AD and correction factor for industrial discharge) used in estimating CH_4 emissions from domestic wastewater.	Resolved. The methodology for estimating domestic wastewater emissions is now fully in accordance with the 2006 IPCC Guidelines. Spain included in the NIR (section 7.4.2.2) an explanation of the new AD and an updated description of the methodology.
W.11	5.D.2 Industrial wastewater – CH_4 (W.13, 2016) (W.13, 2015) Accuracy	Adapt the methodology used to calculate CH_4 emissions from industrial wastewater treatment so that it is in accordance with the 2006 IPCC Guidelines.	Resolved. The methodology for estimating industrial wastewater emissions is now fully in accordance with the 2006 IPCC Guidelines.
KP-LULUCF			
KL.1	General (KP-LULUCF) – CO_2 (KL.3, 2016) (KL.3, 2015) Transparency	Include in the NIR information on the AD sources used for afforestation and reforestation, deforestation, forest management and cropland management.	Resolved. Spain included relevant information on the AD sources used in the NIR (sections 6.1.2, 11.1.3.1, 11.1.3.2 and 11.2.1), which the ERT considers sufficiently clear.
KL.2	General (KP-LULUCF) – N_2O (KL.4, 2016) (KL.4, 2015) Transparency	Provide additional justification in the NIR that the carbon pools litter, deadwood and soil, after the conversion period, for afforestation and reforestation, deforestation, forest management and cropland management, are not a net source of emissions.	Resolved. Spain included in the NIR (sections 11.3.1.2, A3.3.11, A3.3.12 and A3.3.1) several arguments supporting these carbon pools being a net source, for afforestation, reforestation, forest management and cropland management. The ERT considers that the consistency and transparency of some of the arguments need to be improved (see ID# L.7 in table 5). In the case of deforestation, estimates are reported in CRF table 4(KP-I)A.2, therefore this justification is not required for this activity.
KL.3	Article 3.3 activities – CO_2 (KL.5, 2016) (KL.5, 2015) Accuracy	Provide additional justification in the NIR that the transition from forest land to non-herbaceous grassland is not human-induced, or account for the emissions under deforestation.	Resolved. The NIR (section A3.3.9) contains a well-documented justification thereon. During the review, Spain explained to the ERT that it has further analysed the issue in collaboration with a working group (referred to in the NIR, page 6-1, as the "GTT-AFOLU Grupo de Trabajo Técnico de AFOLU"), and confirmed the assumption that this transition cannot be considered as human-induced and therefore is characterized as disturbances on lands under forest management. This issue has been

ID#	Issue and/or problem classification[a]	Recommendation made in previous review report	ERT assessment and rationale
			reassessed by the current ERT (see ID# L.8 in table 5).
KL.4	Article 3.3 activities – CO_2 (KL.6, 2016) (KL.5, 2015) Transparency	Update section 11.5.2.5 of the NIR with the information provided in the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol, and include a link to the report on the technical assessment, which was provided as an annex to the initial report to facilitate the calculation of the assigned amount.	Not resolved. Section 11.5.2.5 of the NIR has not been updated. During the review, Spain informed the ERT that this update will be made in the next NIR.
KL.5	Article 3.4 activities – CO_2 (KL.7, 2016) (KL.7, 2015) Comparability	Use the notation key "NO" for afforestation and reforestation, deforestation and forest management HWP categories to clarify that no activities meeting the requirements of natural disturbances have been observed.	Resolved. The ERT considers that the current use of the notation key "NA" for natural disturbances under afforestation and reforestation and forest management is well explained in the NIR (sections 11.4.4.1 and 11.5.2.6) and that the information on background level and margin is reported in these sections according to the requirements of decision 2/CMP.7, annex, paragraph 33, which allows Parties to voluntarily apply the provision either annually or at the end of the commitment period. In the case of deforestation, mentioned in the previous recommendation, the requirements of natural disturbances are not applicable.
KL.6	Forest management – CO_2 (KL.8, 2016) (KL.8, 2015) Accuracy	Correct the value of the forest management cap in the CRF tables in the submission by calculating the cap in relation to the base year as described in decision 2/CMP.8, annex I, paragraph 1(b).	Not resolved. Spain reports a forest management cap of 81,364.908 kt CO_2 eq in the accounting table. During the review, Spain acknowledged that it did not properly implement this recommendation in the submission and stated that the forest management cap of 79,341.275 kt CO_2 eq would be updated in the next submission.
KL.7	Forest management – CO_2 (KL.9, 2016) (KL.9, 2015) Transparency	Provide additional information in the submission to clearly demonstrate that soil organic carbon is not a source in forest management.	Addressing. Spain included in the NIR several arguments supporting the soil organic carbon pool being a net source. The ERT considers that the argument of the net average of carbon gains is not well supported (see ID# L.7 in table 5).
KL.8	Cropland management – CO_2 (KL.10, 2016) (KL.10, 2015) Transparency	Include in the NIR information on the trends of carbon stock changes in mineral soils in cropland management.	Not resolved. The trends of carbon stock changes in mineral soils in cropland management are not well explained in the NIR (see ID# L.10 in table 5). During the review, Spain explained that this issue has not yet been resolved because it was not included in the provisional main findings of the 2016 review.
KL.9	Harvested wood products – CO_2 (KL.12, 2016) (KL.12, 2015)	Report in the NIR on progress in improving the estimation and reporting of net emissions from HWP.	Not resolved. Progress on this issue was not described in the NIR. In response to a question raised by the ERT during the review, Spain informed the ERT that it

ID[a]	*Issue and or problem classification[a]*	*Recommendation made in previous review report*	*ERT assessment and rationale*
	Transparency		has contracted a national expert to consult on LULUCF issues and that the improvement of HWP estimations is within the scope of the contract. Results in the form of recommendations for improvements to the inventory are expected in October 2017; therefore, progress on this recommendation will be updated in the next NIR.
KL.10	Direct and indirect N2O emissions from N fertilization – N_2O (KL.13, 2016) (KL.13, 2015) Completeness	Identify sources of additional data that could support the reporting and accounting of potential N_2O emissions in forest management and on additional categories under the Kyoto Protocol.	Resolved. The ERT considers that the explanation that forest land remaining forest land areas in Spain are not fertilized, as provided in the NIR (section 6.9, p.6.97, and section 11.3.1.1, p.11.24), is sufficiently clear and justifies the use of the notation key "NO" in the reporting of these emissions.

[a] References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) where the issue and/or problem was raised. Issues are identified in accordance with paragraphs 80–83 of the UNFCCC review guidelines and classified as per paragraph 81 of the same guidelines. Problems are identified and classified as problems of transparency, accuracy, consistency, completeness or comparability in accordance with paragraph 69 of the Article 8 review guidelines, in conjunction with decision 4/CMP.11.

IV. Issues identified in three successive reviews and not addressed by the Party

8. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues included in table 4 have been identified in three successive reviews, including the review of the 2017 annual submission of Spain, and have not been addressed by the Party.

Table 4
Issues identified in three successive reviews and not addressed by Spain

ID[a]	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed[a]*
General		
	No such general issues were identified	
Energy		
E.1	Include the additional information provided during the review, containing disaggregated information on the EFs and plant-specific net calorific values, in the corresponding chapters of the NIR or include the address of the website where this information can be consulted	3 (2014–2017)
IPPU		
I.15	Consider whether it would be possible to publish the AD and HFC-23 EFs per plant, given that production at all plants has ceased	3 (2014–2017)
I.17	Consider how information on the coke production carbon balance and on all carbon balances related to steel-making	4 (2013–2017)

ID[a]	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed[b]*
	processes could be included in the NIR without violating confidentiality	
Agriculture		
A.1	Develop a summary table providing details of the references used in developing the country-specific methodologies and parameters used for the tier 2 approaches, and also provide a table detailing the main parameters used in the tier 2 methodologies	4 (2013–2017)
A.3	Incorporate in the NIR detailed explanations of the AD, assumptions, parameters and EFs used for the country-specific emission estimates in order to improve transparency	4 (2013–2017)
A.4	Provide explanatory information relating to AWMS in the NIR and in the documentation box to CRF table 4.B(b)	4 (2013–2017)
LULUCF		
L.1	Explore the methods provided in chapter 5 of the IPCC good practice guidance for LULUCF in order to consider pre-1990 land uses and land-use changes in the reporting of GHG emissions/removals to improve the accuracy of the LULUCF sector inventory	5 (2012–2017)
Waste		
W.1	Improve the accuracy of the emission estimates by using more country-specific parameters for DOC, MCF and the methane generation rate constant	4 (2013–2017)
W.2	Continue the efforts to reduce the uncertainties of the AD and EFs	4 (2013–2017)
KP-LULUCF		
	No such issues for KP-LULUCF activities were identified	

[a] The review of the 2016 annual submission was held in conjunction with the review of the 2015 annual submission. Since the reviews of the 2015 and 2016 annual submissions were not "successive" reviews, but were held in conjunction, for the purpose of counting successive years in table 4, 2015/2016 are considered as one year.

V. Additional findings made during the 2017 individual inventory review

9. Table 5 contains findings made by the ERT during the individual review of the 2017 annual submission of Spain that are additional to those identified in table 3.

Table 5
Additional findings made during the 2017 individual review of the annual submission of Spain

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and or a problem[a] If yes, classify by type*
General			
G.4	QA/QC and verification	The ERT commends Spain for its detailed QC plan for the calculation of the GHG inventory, comprising checklists incorporated in the database that allow the experts compiling the inventory to perform the QC functions by ticking each item. Nevertheless, some information is missing from the NIR (see ID# E.18 below) and there are cases of inconsistent information between the NIR and the CRF tables (see IDs # I.26, A.19, A.20, KL.12 below). During the review, the ERT noted that the Party has no well-defined procedure to avoid this situation. The ERT recommends that Spain improve its QC procedure to avoid inconsistent information between the NIR and the CRF tables and to include all the necessary information in the NIR.	Adherence to the UNFCCC Annex I inventory reporting guidelines
G.5	QA/QC and verification	The ERT noted that Spain's GHG inventory underwent a complete QA audit in 2008 and two partial QA exercises have occurred since then. Since 2015, there has been a plan to contract a consultancy firm to perform annual QA audits for the whole inventory, but this has not yet been implemented. The ERT considers that the lack of periodic QA audits (other than verification through the European Union and the UNFCCC review processes) might have caused some of the issues in this submission (e.g. see ID#s I.26 and A.19 below) and may compromise further improvements to the inventory. The ERT encourages Spain to explore ways of performing QA functions on its inventory, for example, by inviting experts from the government, universities or scientific institutions to collaborate on this effort.	Not an issue/problem
G.6	National registry	The ERT noted that the national registry does not fully comply with the functions set out in the annex to decision 13/CMP.1. Specifically, as set out as a requirement in paragraph 47(c), information on the total quantity of ERUs issued on the basis of Article 6 projects is missing. The ERT noted that the final assessment on this matter in the SIAR (P1.4.2) has no related recommendation. During the review, Spain provided the missing information on the total quantity of ERUs issued on the basis of Article 6 projects. The ERT recommends that Spain include the information on the total quantity of ERUs issued on the basis of Article 6 projects on its publicly accessible website.	Adherence to reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
Energy			
E.11	Fuel combustion – reference approach – all fuels – CO_2	The ERT noted that annex 4 to the NIR describes the reference approach. A general explanation of the main reasons for the differences between the reference and sectoral approaches is given, but more specific explanations are needed in order to understand all the differences, especially at the fuel category level. During the review, Spain provided several reasons for the differences at the fuel category level, including: non-energy	Not an issue/problem

ID[a]	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem[b]? If yes, classify by type
		use of naphtha and LPG not being considered before 2000; non-energy use of solid fuels not considered by official energy statistics; differences for the lower heating values and carbon content of solid fuels and non-energy use of natural gas not considered before 2004. Spain also pointed out that for previous years of the time series it is to be borne in mind that energy statistics are not revised over time and methodologies may change while inventory data must be kept consistent for the entire time series. The Party mentioned that a review of the reference approach and sectoral approach analysis is an area of improvement for the next inventory submission. The ERT encourages Spain to complete its next NIR submission with additional information on the reasons for the differences between the reference and sectoral approaches provided during the review, including non-energy use of naphtha and LPG not considered before 2000, non-energy use of solid fuels not considered by official energy statistics, and differences for lower heating values and carbon content of solid fuels and non-energy use of natural gas not considered before 2004. The ERT also encourages the Party to provide this information at the fuel category level because the reference and sectoral approaches can be very different at that level.	
E.12	1.A. Fuel combustion – sectoral approach – all fuels – CO_2, CH_4 and N_2O	The ERT noted that for fuel consumption Spain's inventory is fully consistent with the national energy balance as reported by the official national energy data source (the Ministry of Energy) (NIR, section 3.1.1). Consequently, the fuel consumption in the inventory is tallied against the national energy statistics. During the review, Spain clarified that this principle of full consistency is followed for energy uses but not for non-energy uses, for which the inventory team relies more on data from its own individualized questionnaire. The ERT asked for details about the checks undertaken to verify consistency with the energy balance and the internal procedures for re-balancing the energy consumption in order to avoid double counting or omissions between energy and non-energy uses (especially for natural gas, petroleum coke and LPG). For natural gas consumption, the Party was able to show evidence of full consistency between the inventory energy balance (presented in annex 2 to the NIR) and the national energy balance sent to Eurostat (total available amount of natural gas in Spain). Spain also explained in detail the process for adjusting the subcategories of fuel consumption according to the data available from individualized questionnaires. As a consequence of these discussions, the ERT was able to confirm that the methodology followed by the Party does not lead to double counting or omission of emissions. The ERT recommends that Spain improve transparency regarding its use of the national energy balance in the inventory by: (a) explaining the application of the full consistency principle for energy use and how consistency is ensured for non-energy use; (b) describing, at a detailed activity level, the automatic checks carried out by the queries in the database and the procedures to re-balance excessive or missing fuel consumption; and (c) providing a reference in section 3.1.1 of the NIR to the detailed data in annex 2.	Yes. Transparency
E.13	1.A. Fuel combustion – sectoral approach – all fuels – CO_2,	In chapter 3 (energy) of the NIR, the ERT noted that fuel consumption for several categories fluctuates throughout the time series. This is the case, for example, for the consumption of natural gas in category 1.A.1.c (increases by 3,173.8 per cent between 2005 and 2006), for LPG in category 1.A.2 (decreases by 93 per cent between 2012 and 2013) and its subcategories (total disappearance of LPG energy consumption in subcategories of 1.A.2), and for petroleum coke in category 1.A.2.c (decreases by 100.0 per cent between 2012 and 2013). The	Yes. Consistency

ID[a]	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and or a problem?*[b] *If yes, classify by type*
	CH_4 and N_2O	ERT was not able to find satisfactory explanations for these fluctuations in the NIR. During the review, Spain explained that these anomalies in the time series result from a combination of factors: changes in the consumption market owing to environmental restrictions (emanating from the EU ETS, air quality and "best available techniques references") as well as energy costs and methodological changes in the official energy statistics. The Party mentioned that the energy statistics are not recalculated for previous years when there is a change in methodology. Regarding the periods 2005–2006 and 2012–2013, the fluctuations correspond to the implementation of methodological improvements by the Ministry of Energy; the ministry was able to refine the split of fuels by subcategory based on new information, which led to the sharp increases and decreases observed. The ERT understands that the fuel consumption data for the inventory (CRF table 1.A) are not based on a consistent methodology throughout the time series and that changes made by the statistical office do not lead to recalculations for previous years. This can be observed in various subcategories of CRF table 1.A in which consumption throughout the time series sharply increases or decreases. This is an important issue for time-series consistency and comparability; however, given that Spain provided to the ERT evidence that all fuel consumption is considered in the inventory, the ERT concludes that the problem is one of misallocation between subcategories in CRF table 1.A throughout the time series. The ERT recommends that Spain's inventory team and the Ministry of Energy work in close cooperation to develop a method whereby all methodological improvements (methodological refinements for recent years) are applied in the energy balance for previous years of the time series so that a consistent data set is produced. If this is not possible, the ERT recommends that Spain consider revising its principle of full consistency with the national energy balance at the subcategory level and develop its own internally consistent energy balance for previous years of the time series.	
E.14	1.A. Fuel combustion – sectoral approach – natural gas – CO_2	The ERT noted in CRF tables 1.A(a)s1–4 that Spain generally uses 56.10 kg CO_2/GJ as the CO_2 EF for natural gas, which is the default value from the 2006 IPCC Guidelines. Natural gas is key for several categories (1.A.1.a, 1.A.2, 1.A.4), and the guidelines advise that when a category is key, it is good practice to obtain country-specific data in order to move to a tier 2 EF. Although it was not explicitly included in the inventory improvement plan, the ERT noted that for natural gas Spain already has the information (annual data on fuel characteristics, provided by the main network operator) required to move from a default EF to a country-specific one. The Party plans to implement this change in the next inventory for the activities where the default EF is still used. The ERT recommends that Spain upgrade its CO_2 EF for natural gas from a default to a country-specific one, and implement this EF in its annual submission for all relevant key categories activities. The ERT also encourages Spain to implement the CO_2 country-specific EF for natural gas in non-key categories.	Yes. Accuracy
E.15	1.A.1.b Petroleum refining – other fossil fuels – CO_2,	For other fossil fuels in category 1.A.1.b, the ERT noted inter-annual variation in the CO_2 IEF for recent years (e.g. between 2013 (70.5 t/TJ) and 2014 (100.8 t/TJ), the CO_2 IEF increased by 42.9 per cent). Some information regarding the origin of this other fossil fuel is provided in the NIR (section 3.3.2) but during the review the ERT asked the Party for more details. Spain explained that "waste gas" is a residual gas produced and burned in one	Yes. Comparability

ID[a]	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem[b]? If yes, classify by type
	CH_4 and N_2O	refinery from two processes (hydrogen production and Biturox-specific asphalt production) and re-circulated at the processes' tail end. The characteristics of this gas vary widely over the years. If Spain cannot properly justify alternative uses for this gas, the ERT recommends that Spain reallocate the waste gas emissions from category 1.A.1.b to 1.B.2.c (venting and flaring), because the waste gas is clearly burned in furnaces for elimination and not for calorific purposes.	
E.16	1.A.3.b.iv Motorcycles – gasoline – CO_2	The ERT noted that the CO_2 IEF for gasoline consumption by motorcycles at 72.37–77.93 t/TJ is among the highest of all reporting Parties (ranging from 62.86 to 77.93 t/TJ) and is higher than the IPCC default value (69.30 (67.50–73.00) t/TJ). During the review, Spain explained that CO_2 emissions reported for gasoline are actually CO_2 emissions from gasoline and lubricant consumption by two-stroke engines, whereas the reported AD refer only to gasoline consumption by motorcycles. Consequently, the resulting CO_2 IEF is higher than expected. The Party provided detailed data for gasoline and lubricant consumption together with the corresponding CO_2 emissions: these data show that the CO_2 IEF for each fuel is within the IPCC default value range. Nevertheless, the ratio "lubricant consumptions for 2-strokes/gasoline consumptions for motorcycles" fluctuates over the time series (especially for 2001–2002, 2005–2006 and 2011–2014). Spain informed the ERT that variations between years are mainly explained by changes in motorcycle mileage, which is obtained annually from official traffic statistics. In addition, the Party detected an incorrect estimation of the lubricant/gasoline ratio in motorcycles owing to an error in the calculation formula. Spain estimated the impact of this error (63.7 kt CO_2 eq on average every year, meaning 0.08 per cent of total emissions from the transport sector (1A3b) and 0.017 per cent of the global inventory emissions) and stated that it will be corrected in the next inventory submission. The ERT believes that future ERTs should consider this issue further to ensure that there is not an underestimate of emissions for this activity. The ERT recommends that Spain correct the lubricant/gasoline ratio in the calculation formula for lubricants in two-stroke engines and explains in the NIR the variations over the time series. Further, the ERT recommends that AD and emissions for lubricants are reported separately from gasoline (e.g. in the other liquid fuels category) in the CRF tables.	Yes. Accuracy
E.17	1.B.2.b Natural gas – distribution – CH_4	The ERT noted inter-annual fluctuations in the CH_4 IEF for category 1.B.2.b.5 (for the years 1996–1997 (–27.7 per cent), 2008–2009 (18.0 per cent), 2010–2011 (11.8 per cent), 2012–2013 (12.3 per cent) and 2013–2014 (10.8 per cent)) that are not explained in the NIR. During the review, Spain explained that the Spanish gas association (Sedigas) provides annual estimates for fugitive natural gas emissions from the distribution network. Different EFs are applied throughout the time series depending on the types of pipeline used as well as the length of the distribution network. The Party provided calculated data together with an analysis of the correlation between emissions and gas distribution network length. Regarding the variation in CH_4 IEF, the AD reported in the CRF tables correspond to the whole amount of gaseous fuel distributed in the country according to the official statistics, which does not take into account the detailed parameters of the network (pipeline type and	Yes. Transparency

ID[a]	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem[29] If yes, classify by type
		network length).	
		The ERT recommends that Spain improve the transparency of reporting by including in its NIR a summary of the analysis of the correlation between CH_4 emissions and gas distribution network length, which was provided during the review.	
E.18	1.B.2.c Venting and flaring – flaring in oil – CO_2	The ERT noted from the description of the methodology in the NIR (section 3.12.2.2) that CO_2 emissions from flaring in refineries are estimated based on tier 1 EFs. Given that the use of EU ETS data would allow Spain to increase the accuracy of its estimates, the ERT enquired during the review whether the Party has considered using these data. Spain responded that CO_2 emission estimates from refinery flaring are indeed based on individualized questionnaires that are fully consistent with EU ETS data and that the problem is only that the NIR description has not been updated.	Yes. Transparency
		The ERT recommends that Spain correct the description in the NIR of the methodology for flaring in refineries to explain that CO_2 emission estimates from refinery flaring are based on individualized questionnaires that are fully consistent with EU ETS data.	
E.19	1.B.2.c Venting and flaring – flaring in gas – CO_2	The ERT noted fluctuations in the trend of the CO_2 IEF for category 1.B.2.c.2.ii (for example +625.8 per cent between 2011/2012 (from 127,849 t CO_2/unit in 2011 to 927,922 t CO_2/unit in 2012) or –87.7 per cent between 2014/2015 (from 1,834,590 t CO_2/unit in 2014 to 226,398 t CO_2/unit in 2015). A specific explanation for the trend is not provided in the NIR. During the review, Spain explained that the AD reported for 1.B.2.c.2.ii are the sum of natural gas produced and processed (in millions of cubic metres) (flaring activities for the production and processing of natural gas use tier 1 EFs) and of natural gas burned in flaring in regasification plants (in millions of cubic metres) (transport of natural gas). The ERT noted that the reported AD do not correspond well with the reported emissions, which explains the fluctuating trend. The Party agreed with the ERT that the unit used in CRF table 1.B.2 ("Mm3 gas consumption") may be confusing and is not appropriate.	Yes. Transparency
		The ERT recommends that Spain change the unit used in CRF table 1.B.2 and report AD that are more representative of all activities under category 1.B.2.c.2.ii (e.g. AD related to gas burned in flaring) so that trends in the IEF may be linked to a relevant driver of the emissions.	
IPPU			
I.20	2. General (IPPU)	The ERT noted that categories in the NIR are not listed in the same order as in the CRF tables – in the NIR they are ordered by contribution to the total emissions of the sector. The ERT considers that this reduces the transparency of the NIR.	Not an issue/problem
		The ERT encourages Spain to report IPPU categories in the NIR in the same order as that in the CRF tables and to maintain in the chapter for the IPPU sector the introduction, in which the main categories contributing to emissions of the sector are described.	

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? If yes, classify by type
I.21	2. General (IPPU)	The ERT noted that emissions in the IPPU sector were recalculated (e.g. from category 2.A.1 owing to an update of the AD and the EF of one plant for the years 2013 and 2014), but no information is available in the NIR to explain these changes. Spain, upon request, provided relevant information during the review. The ERT recommends that Spain transparently report in its NIR recalculations for the IPPU sector, including explanations of considerations and rationale.	Yes. Transparency
I.22	2.A.1 Cement production – CO_2	Spain included links to technical documents in the cement production sector that explain the methodology used to estimate CO_2 emissions, however, the ERT noted that one link is not working. The Party provided the correct link during the review. The ERT recommends that Spain ensure all links to reference documents in the NIR are functional.	Yes. Transparency
I.23	2.A.4 Other process uses of carbonates – CO_2	The ERT noted that Spain, on the basis of a subcategory analysis, does not consider 2.A.4 as a key category in the NIR, although it is listed as a key category, excluding LULUCF, in CRF table 7. According to the aggregation level described in table 4.1 of the 2006 IPCC Guidelines, category 2.A.4 should be considered separately in a key category analysis. During the review, Spain agreed with the ERT's remark on this. The ERT recommends that Spain use the aggregation level of analysis suggested for approach 1 in table 4.1 of the 2006 IPCC Guidelines; and identify those subcategories as significant that together contribute more than 60 per cent of emissions of this key category.	Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines
I.24	2.B.8 Petrochemical and carbon black production – CO_2	The ERT noted that while CO_2 emissions from petrochemical and carbon black production is a key category, Spain made calculations for this category using default CO_2 EFs. Ethylene production is considered significant, and responsible for 92 per cent of the category-level emissions in 2015. During the review, the Party explained that plant-specific data exist but an analysis of their suitability for calculating emission estimates has not been finalized. The ERT recommends that Spain estimate CO_2 emissions from ethylene production using a tier 3 method, applying a plant-specific CO_2 EF or a tier 2 carbon balance.	Yes. Accuracy
I.25	2.C.1 Iron and steel production – CO_2 and CH_4	In the NIR, tables 4.5.3, 4.5.4, 4.5.5 and 4.5.6 have some empty cells or are not filled at all owing to confidentiality restrictions. During the review, Spain provided the information it used to calculate emissions. The ERT considers that the Party could increase the transparency of reporting for this category by providing a general comparison between the carbon content of process materials and the default carbon content values provided for process materials in the 2006 IPCC Guidelines as well as carbon balances indexed to the base year. This analysis should also resolve ID# I.17 (see table 3). The ERT recommends that Spain report a qualitative analysis of information that is subject to confidentiality restrictions (e.g. a comparison of carbon contents applied by Spain with default EFs or trends of AD indexed to	Yes. Transparency

ID[a]	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?[b] If yes, classify by type*
		the base year) rather than including empty tables in the NIR.	
I.26	2.F.1 Refrigeration and air conditioning – HFCs and PFCs	In the NIR, tables 4.2.1 and 4.2.2 contain zeros in cells where AD or emissions do exist (e.g. HFC-134a and C_2F_6). Upon request by the ERT, during the review Spain provided the corrected tables that included the relevant data. The ERT recommends that Spain replace the zero values with the relevant data in tables 4.2.1 and 4.2.2 of the NIR, and improve its QA/QC procedures so as to avoid such errors.	Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines
I.27	2.F.1 Refrigeration and air conditioning – HFCs and PFCs	The ERT noted that Spain uses a mass balance approach to estimate HFC and PFC emissions for this category. The mass balance approach requires sales and stock data as inputs according to the 2006 IPCC Guidelines. During the review, the Party explained that it does not consider sales or stock data necessary to estimate emissions. The ERT agrees with this assessment because in the case of Spain, Law 16/2013 ensures the provision of the information needed to guarantee a mass balance, by tracing every kilogram of substance entering or leaving the country. The ERT recommends that Spain, in its NIR, provide an explanation, with the help of a flow chart, of how Law 16/2013 justifies the use of a mass balance without the need to consider sales or stock.	Yes. Transparency
I.28	2.F.1 Refrigeration and air conditioning – HFCs and PFCs	Spain does not calculate HFC and PFC emissions from the end-of-life of equipment or from small sealed units used for domestic air conditioning. The AD provided by the Party during the review show that emissions do occur from this equipment in the years 2013–2015; however, the emissions are below the threshold of 500 kt CO_2 eq or 0.1 per cent of total national emissions. The ERT noted that most equipment in Spain is not yet at the end-of-life stage, which explains the current small contribution of this equipment to the overall emissions of this category. The ERT recommends that Spain use information provided under the framework of Law 16/2013 to calculate emissions from end-of-life equipment and small sealed units used for domestic air conditioning or to report the emissions as "NE", and clearly demonstrate in the NIR that emissions associated with this category can be considered insignificant in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Yes. Transparency
I.29	2.F.1 Refrigeration and air conditioning – HFCs and PFCs	Spain uses the tier 1b methodology to calculate HFC and PFC emissions from this category because the estimates are made at the application level. However, the ERT noted that 2.F.1 is a key category. During the review, Spain agreed with the ERT that it is necessary to obtain information at the sub-application level and move to a higher-tier methodology. The ERT recommends that Spain obtain information provided under the framework of Law 16/2013 and/or from other sources of sub-application level data that will allow it to use the tier 2b methodology for estimating	Yes. Accuracy

ID[a]	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and or a problem?[b] If yes, classify by type
		emissions from this category.	
I.30	2.F.1 Refrigeration and air conditioning – HFCs and PFCs	Spain uses HFC-134a consumption as a driver to extrapolate other F-gases from 2014 back to 1998. (In 1996 and 1997 historical information was available on sales of HFCs and PFCs in the sector refrigeration and air conditioning, facilitated by the National Association of Companies of Refrigeration and Air Conditioning (ANEFRYC)). However, the ERT noted that not all the commercial refrigerants in use in 2014 have been available since 1998. During the review, the Party, while agreeing with the ERT that not all commercial refrigerants have been available since 1998, explained that HFC-134a consumption is nevertheless a suitable driver to extrapolate other refrigerants because the consumption of HFC-134a explains statistically the growth of the sector. The ERT recommends that Spain include in the NIR an analysis showing why HFC-134a consumption is a suitable driver to extrapolate other refrigerants. The ERT further recommends that Spain incorporate into its analysis information on the historical availability of commercial refrigerants, in order to improve the extrapolation of F-gases from 2014 to 1998.	Yes. Accuracy
I.31	2.F.1 Refrigeration and air conditioning – HFCs and PFCs	Spain used the notation key "NA" for AD and emissions in CRF table 2(I).B-Hs2 for some F-gases (e.g. HFC-41, HFC-134, HFC-143). During the review, the Party explained that these F-gases do not occur in Spain. The ERT recommends that Spain change the notation key from "NA" to "NO" for HFC-41, HFC-134, HFC-143 and all other F-gases that do not occur in refrigeration and air conditioning in the country.	Yes. Comparability
Agriculture			
A.17	3. General (agriculture)	CH_4 and N_2O emissions from category 3.F (field burning of agricultural residues) were recalculated for the second-to-last year of the inventory (2014). When comparing the 2016 and 2017 submissions, for the year 2014, emissions decreased significantly, from 25.42 kt CH_4 to 0.95 kt CH_4 and from 0.31 kt N_2O to 0.02 kt N_2O. The ERT noted that the NIR does not include an explanation for this recalculation. During the review, Spain explained that to calculate emissions for the last year of the inventory (2015 in this submission), crop information from the second-to-last year is used because when the inventory is compiled, information for the last year is not yet available in the national statistics. This results in later recalculating the second-to-last inventory year. The ERT noted that there is a general increase of emissions, except for one outlier in 2013, so keeping AD constant may be a source of underestimation. The ERT recommends that Spain improve its methodology to avoid potential underestimates and report its recalculations, including all considerations and explanations. The ERT believes that future ERTs should consider this issue further to ensure that there is not an underestimate of emissions for this activity.	Yes. Accuracy

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?[a] If yes, classify by type*
A.18	3. General (agriculture) – CO_2, CH_4 and N_2O	Spain is in the process of updating and developing several studies related to the characteristics of its livestock populations. These studies are expected to result in more accurate AD and therefore facilitate improved emission estimates (tier 2) of the key categories in enteric fermentation. This new information will generate recalculations in future submissions. The ERT commends Spain for the efforts made to improve reporting of the sector; however, it notes that these efforts are not well documented in the NIR. The ERT encourages Spain to develop a table that identifies the studies in progress and their expected completion dates as well as when the information resulting from them will be used in the estimates and, if possible, other improvements that may be considered in the future, for example, improvements related to MMS. The ERT therefore encourages the Party to make efforts in similar improvements in other key categories in agriculture, for example, in manure management, where it could conduct studies to improve and update existing information on the characteristics of different MMS.	Not an issue/problem
A.19	3. General (agriculture)	In the NIR, table 5.1.3 on key categories for inventory year 2015 contains different values for emissions from those presented in other parts of the NIR and the CRF tables. During the review, the ERT together with Spain determined that the table had not been updated since the previous annual submission. The ERT also identified other inconsistencies between the NIR and the CRF tables. The ERT recommends that Spain update table 5.1.3 in the NIR to reflect the key category analysis from the latest annual submission and improve the QA/QC procedures to correct the identified errors in the NIR and the CRF tables.	Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines
A.20	3. General (agriculture) – livestock	The ERT noted some differences between the AD from livestock numbers reported in the NIR and official national statistics. During the review, Spain explained that the AD used to estimate livestock numbers were an average of the national surveys made in May and November each year. However, when reviewing the information from the national surveys, the ERT noted some minor differences between the reported information in both the NIR or the CRF tables and the averages of these surveys; for example, for white swine, the Party reported 2,626 more animals in the NIR and CRF tables than the average of numbers that appear in the statistics for 2015. The ERT recommends that Spain review the numbers of animals used in the estimations for the entire time series and ensure that the populations reported in the NIR and CRF tables 3.B(a)s1 and 3.B(b) are consistent with those reported in Spain's national survey, documenting the reasons for any derivation thereof, and explain in the NIR the method used to obtain the AD.	Yes. Accuracy
A.21	3.A.2 Sheep – CH_4 3.B.2 Sheep – CH_4 and N_2O	Spain uses a tier 1 method and default EFs from the 2006 IPCC Guidelines to estimate CH_4 emissions from enteric fermentation and CH_4 and N_2O emissions from manure management from sheep. During the review, the Party explained that national studies on sheep characteristics were prepared, reviewed and ready to be published,	Yes. Accuracy

ID[a]	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and or a problem?[a] If yes, classify by type
		which would allow Spain to move to a tier 2 method and country-specific EFs. The ERT recommends that Spain implement a tier 2 method and country-specific EFs to estimate the CH_4 emissions from enteric fermentation and CH_4 and N_2O emissions from manure management from sheep, using the new information from the national studies on sheep characteristics.	
A.22	3.(I).B.4 Other livestock – CH_4	Spain reported CH_4 emissions from other animals under the subcategory other livestock in CRF table 3.B(a)s1, but it was not clear which animals were included in this subcategory. During the review, the Party explained that these emissions come only from turkeys. The ERT noted that additional information on other livestock is not reported in CRF table 3.B(a)s2, and it is not possible to identify which MMS are considered in the estimates of emissions from these animals. The ERT recommends that Spain indicate in the NIR that the emissions in this category come only from turkeys and fill CRF tables 3.B(a)s1 and 3.B(a)s2 with all of the required information, including the MMS, for these animals.	Yes. Transparency
A.23	3.(I).B.3 Swine – CH_4	Spain reported in CRF table 3.B(a)s1 the same distribution of population in cool and temperate climates for white swine and Iberian swine (72.1 per cent cool and 27.9 per cent temperate). The ERT considers that the reported distribution should be different for white swine and Iberian swine because they live in different regions (i.e. Iberian swine live only in regions with cork and holm oak). During the review, the Party confirmed that it does estimate CH_4 emissions from swine manure management using information on different temperatures from the different regions in the country for the different types of swine, and hence the distribution of population for Iberian swine reported in CRF table 3.B(a)s1 is wrong. The ERT recommends that Spain review the information on the population of white swine and Iberian swine allocated to different climates and fill CRF tables 3.B(a)s1 and 3.B(a)s2 with the correct information.	Yes. Transparency
A.24	3.(II).D.A Direct N2O emissions from managed soils – N_2O	Spain uses a tier 1 method and default EFs from the 2006 IPCC Guidelines to estimate direct N_2O emissions from managed soils. During the review, the Party explained that most meta-analyses of N_2O emissions do not include data from studies of the Mediterranean region, and presented an article containing meta-analyses of N_2O emissions from Mediterranean cropping systems (Cayuela et al., 2017). The article proposes a regional EF for N_2O, distinguishing the effects of water management, crop type and fertilizer management. The average overall EF for Mediterranean agriculture is 0.5 per cent, which is substantially lower than the IPCC default value of 1.0 per cent. Spain is considering using this EF in future inventories. During the review, the ERT could not assess this study in sufficient detail to identify whether the considerations made in this study are applicable to Spain. The ERT recommends that Spain validate and verify the results of the study (Cayuela et al., 2017) and evaluate and justify in which cases the EF would be applicable for Spain, before using it in the national inventory estimates.	Yes. Accuracy

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem[a]? If yes, classify by type*
LULUCF			
L.4	4. General (LULUCF)	During the review and in response to suggestions from the ERT to better explain trends (see ID# L.10 below) and the relationship between trends of related categories (see ID# L.5 below), Spain raised a concern about requests made by ERTs that would lead to further information being provided in the NIR on LULUCF, and which may affect the balance between length and usability of the report. The ERT considers that reported estimates need to be adequately explained in the NIR. The ERT also considers that, although the NIR is well structured and informative, which facilitates the review process, it could benefit from the few improvements that were suggested by the ERT and discussed with the national experts, and that could help the Party to achieve an adequate balance of length and usability of the report. The ERT noted, for example, that annex 3.3 to the NIR contains a scanned copy of a reference that takes up 35 pages. On page A3.14 of the NIR Spain explains that its inclusion was recommended in the review report of the 2014 annual submission. The ERT considers that while this information is useful for assessing the biomass expansion factors used for forest land estimates, the bibliographic details could be listed in the references list of the NIR or a copy could be provided to the ERT upon request if the reference is not publicly available. The ERT recommends that, for details related to methods, equations and parameters used in the estimations, which can be found in external references (e.g. scientific papers, studies, IPCC guidelines) that are publicly available or can be provided to the ERT upon request, Spain mention the relevant references in the NIR instead of including full copies of all of the information in the NIR.	Yes. Transparency
L.5	4. General (LULUCF) – CO_2	The ERT noted an inconsistency between the trend of net carbon stock changes in living biomass in forest land remaining forest land reported in CRF table 4.A and the trend in production of HWP (currently assumed to come fully from lands under forest management) reported in CRF table 4.Gs2 and in tables 6.8.1 and 6.8.2 of the NIR. The ERT specifically noted that, while the net carbon gains in living biomass show a sharp increase over the period 1997–2001 (from 6.25 to 7.28 Mt carbon, an increase of 16.4 per cent) and stay generally stable afterwards, the volumes of HWP extracted from the forest almost doubled over the period 1992–2006 for paper and paperboard (from 3.40 to 6.90 Mt, a 95.0 per cent increase) and for sawnwood and wood panels (from 4.70 to 8.90 Mt, an 85.0 per cent increase). During the review, Spain explained the different data sources used and how the AD are integrated into the inventory. The ERT recommends that Spain provide in the NIR a clearer explanation of the relationship between the trends for net carbon gains and losses in forest land and changes in the amount of HWP extracted from forests and how time-series consistency of AD is ensured when different data sources are used, for example by using information and graphs to facilitate these comparisons. The ERT encourages Spain to provide an analysis of trends and consistency between forest and HWP estimates at the relevant level (e.g. climatic regions or autonomous communities), as suggested by the ERT to national experts during the review.	Yes. Transparency
L.6	4.A Forest land	The ERT could not find in the NIR definitions for the classification of forests into Levels I and II as referred to in	Yes. Transparency

ID[a]	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and or a problem[b] If yes, classify by type
		sections 6.1.6, A3.3.11 and A3.3.12. During the review, Spain explained that Level I forests refer to forests under monitoring based on around 6,000 observation plots on a systematic transnational grid of 16 × 16 km throughout Europe and beyond to gain insight into the geographic and temporal variations in forest condition, and Level II forests refer to forests under intensive monitoring that comprises around 500 plots in selected forest ecosystems with the aim of clarifying cause–effect relationships. Spain further referred to official websites (ICP Forests (http://icp-forests.net/) and MAPAMA (www.mapama.gob.es/es/desarrollo-rural/temas/politica-forestal/inventario-cartografia/redes-europeas-seguimiento-bosques/default.aspx) for further information. The ERT recommends that Spain include the definitions for the classification of forests into Levels I and II in the NIR, as part of the text or as footnotes when the text refers to them, with links to the websites of ICP Forests and the Ministry of Agriculture and Fisheries, Food and Environment for further details.	
L.7	4.A.1 Forest land remaining forest land – CO_2	Spain reported net carbon stock changes in deadwood, litter and mineral soils as "NE" in CRF table 4.A and provided information in the NIR to justify that these carbon pools are in equilibrium based on the tier 1 assumption of the 2006 IPCC Guidelines. The ERT considers that some of the justifications the Party used in the NIR do not adequately justify that assumption. For example, for the dead organic matter pools, the explanation of stable harvest trends in Spain throughout the reporting period is not well supported in the NIR because the supporting statistics provided in table A3.3.11.14 are not consistent with the FAO production statistics used as AD for HWP (as reported in CRF table 4.Gs2). Similarly, for the soils pool, the explanation of net carbon gains is not well supported, because the data presented in the NIR (table A3.3.12.2) show a randomness of more carbon losses in plots measured every 11 years in relation to more carbon gains measured at a lower frequency, which was unclear to the ERT. During the review, information was provided by the Party to the ERT that was more relevant and better supported the explanations, including: (a) some analyses and examples for a few of the more productive provinces based on biomass stocks from the latest NFI (cycles 3 and 4) showing net increases in the forest biomass, and a few tables and graphs of harvest rates and biomass stocks stratified by province showing the low intensity of harvest in relation to the permitted levels, delay in some of the harvest cycles, and increase of carbons stocks in non-productive stands; and (b) a proposal for the stratification of plots for the analysis of carbon in the soils pool based on combined data from the ICP Forest monitoring networks (forests Levels I and II) and the Spanish forest map, showing variable distributions of plots by province and by forest species. The ERT recommends that Spain include information in the NIR that better supports the explanation of stable harvest trends in the country which is used to justify the assumption that the deadwood and litter pools are in equilibrium. The ERT also recommends that the Party more transparently explain in the NIR the explanation of net carbon gains in soils which is used to justify the assumption that the soils pool is in equilibrium, for example by using relevant stratification of the supporting statistics similar to the examples discussed during the review (i.e. analysis by region or by leading tree species).	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and or a problem?[a] If yes, classify by type*
L.8	4.A.1 Forest land remaining forest land – CO_2	Spain reports forest conversion to non-herbaceous grassland as land converted to grassland under the Convention and under forest management instead of deforestation under the Kyoto Protocol. The main explanation used for the justification provided in the NIR (section A3.3.9) for the assumption that forest conversion to non-herbaceous grassland is not human-induced is that this conversion is a result of natural disturbances or natural changes in the vegetation cover, and that forest may regenerate on these lands in future years. Spain also noted that the latest assessments conducted on this issue seem to indicate that the changes are related to cartographic differences; therefore, it is assessing the option to consider them as temporary changes in tree cover and keep the affected areas under forest land remaining forest land. The ERT considers that the Party should report these lands under forest land remaining forest land given that these are not permanent land-use changes according to the land definitions given by Spain in the NIR (section 6.1.1). The ERT recommends that Spain consider the land areas converted from forest to non-herbaceous grassland to be non-human induced and non-permanent land-use change and reallocate the resulting emissions or removals to forest land remaining forest land, which will improve consistency in the reporting of these estimates between LULUCF and KP-LULUCF, because these lands are adequately reported under forest management for KP-LULUCF.	Yes. Consistency
L.9	4.A.2 Land converted to forest land – CO_2	The ERT noted that in the NIR (table 6.2.12) the uncertainty associated with the EFs used for the estimation of CO_2 emissions/removals on land converted to forest land is 600 per cent, the highest uncertainty value in the sector. During the review, Spain explained that the uncertainty of the EFs in the LULUCF sector is generally assigned in a qualitative way, following the rating scale set out in the *EMEP/EEA Air Pollution Emission Inventory Guidebook 2013* (part A, chapter 5, table 3.2), and that the high value for this category is driven mainly by the high rate scale associated with the EF used to estimate carbon stock changes in the soils pool. The greatest uncertainty (for soil organic carbon) was assigned to the total estimate as a conservative approach. The ERT notes that this is a key category for both level and trend criteria and, according to the 2006 IPCC Guidelines, it is good practice to focus efforts on reducing uncertainty for key categories as far as practicable. The ERT recommends that Spain investigate the approach used to generate the uncertainty analysis for this category and whether assigning the high uncertainty associated with one pool (soil organic carbon) to the total uncertainty estimate for the category as a conservative approach is consistent with the 2006 IPCC Guidelines.	Yes. Accuracy
L.10	4.B.1 Cropland remaining cropland – CO_2	Drivers of trends in carbon stock changes on cropland remaining cropland are not adequately explained in the NIR. For example, it is not clearly explained what changes in management practices or in land use drove: (a) the large increase in carbon gains between 2012 and 2014 (163.7 per cent); and (b) the large increase in soil carbon between 1990 and 2015 (2 392.8 per cent). During the review, Spain better explained the drivers for these trends as owing to: (a) the AD associated with crop transitions that shows ongoing peaks and troughs possibly driven by a combination of different factors such as the market price of goods produced, aid to farmers, age of cultivated plants and weather, resulting in a surface area of crop transitions in 2012 of 330.103 hectares while in 2014 it reached 169.367 hectares; and (b) the application of soil conservation techniques and the effect of a linear	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a] If yes, classify by type
		interpolation of carbon stock changes carried out from 1990 to 2006 (recommended in previous review reports), assuming zero change in 1990 as there were no such practices at that time (this assumption is supported by expert judgment INV-ESP-JE/AGR/2014-001 included in annex 8 of the inventory), as well as the process for integration of the two data sources used throughout the time series (for the period 1990–2003, AD come from the *Anuario de Estadistica Forestal*, 2013). The ERT recommends that Spain include in chapter 6 of the NIR explanations for the trends in estimates for cropland remaining cropland (e.g. an increase in carbon gains between 2012 and 2014 and a large increase in soil carbon between 1990 and 2015) and of how time-series consistency is ensured, given that two data sources are used for the reporting period.	
L.11	4.C.1 Grassland remaining grassland – CO_2	The ERT noted that Spain is reporting carbon stock change in the soil pool in grassland remaining grassland in CRF table 4.C as "NE" with the explanation that "There is a lack of reliable statistics on activity data to estimate these emissions". During the review and in response to questions from the ERT in relation to ID# L.3 (in table 3 above), Spain provided the information that, in its 2017 inventory submission to the European Commission, preliminary and non-binding annual estimates of emissions and removals from grazing land management which can be used as a base to report initial estimates in grassland remaining grassland, using IPCC methodologies, were made for the first time in order to comply with obligations foreseen in Article 3, paragraph 2(a) and (b), of European Union decision 529/2013/EU on LULUCF. The Party reported preliminary estimations of the carbon stock changes in mineral soils, and emissions and removals, but has not yet decided to report them to the UNFCCC in the GHG inventory. The preliminary estimates were shared with the ERT during the review. The ERT commends the Party for this effort to improve the completeness of its GHG inventory and recommends that the Party implement and/or report on progress in the implementation of the reporting of carbon stock change in the soil pool in grassland remaining grassland.	Yes. Completeness
L.12	4 (III) Direct N_2O emissions from N mineralization/immobilization – N_2O	The ERT, after comparing AD for land-use change in CRF tables 4.A, 4.B, 4.C and 4(III) with those land areas reported in CRF table 4(III), determined that Spain seemed to be reporting direct N_2O emissions from nitrogen mineralization/immobilization owing to land-use change for certain transitions only (e.g. in the case of land converted to forest land, only the area for wetlands converted to forest land is reported in CRF table 4(III)). In response to a question raised by the ERT, the Party explained that N_2O emissions in CRF table 4(III) are estimated and reported only for transitions that lead to a loss of soil carbon, based on the 2006 IPCC Guidelines (chapter 11). The ERT recommends that Spain clearly indicate in the NIR (e.g. in table 6.11.1) which land transitions lead to a loss of soil carbon and, therefore, which direct N_2O emissions from nitrogen mineralization/immobilization are reported in CRF table 4(III).	Yes. Transparency

ID[a]	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem[b]? If yes, classify by type*
L.13	4 (V) Biomass burning – CO_2	The ERT noted that CO_2 emissions from biomass burning on cropland remaining cropland and grassland remaining grassland are reported as "NE". In response to a suggestion from the ERT during the review to use the notation key "NA" to report these emissions, which would be in accordance with the 2006 IPCC Guidelines (volume 4, sections 5.2.4 and 6.2.4), Spain explained that the notation key "NE" was reported in both cases for transparency and for consistency with the notation keys reported for CH_4 and N_2O emissions, as no AD are currently available to estimate any of these emissions. The Party noted that it is aware of the indications in the 2006 IPCC Guidelines for these two categories (as stated in sections 6.3.4.1.4 (for cropland remaining cropland) and 6.4.4.1.4 (grassland remaining grassland) of the NIR), and agreed with the ERT's suggestion to use the notation key "NA" for CO_2 emissions from biomass burning on cropland and grassland soils. The ERT recommends that Spain estimate and report these CO_2 emissions if suitable data become available, or either use the notation key "NA" for CO_2 emissions from biomass burning on cropland remaining cropland and grassland remaining grassland if the emissions released can be assumed to be absorbed in the next growing season in accordance with the 2006 IPCC Guidelines, or use the notation key "IE" if Spain can demonstrate that these emissions are already covered in CRF tables 4.B and 4.C.	Yes. Completeness
L.14	4 (V) Biomass burning – CH_4 and N_2O	The ERT noted that CH_4 and N_2O emissions from wildfires on cropland remaining cropland are reported as "NE" for the entire time series. During the review, Spain explained that work on estimating emissions from this category started in 2017. Data on insured areas of cropland accidentally burned (including information on crop types, surfaces and years of occurrence) have been obtained from the State Agency of Agricultural Insurance. While not all croplands are insured, these AD could be representative of most of this activity, and emissions from wildfires on cropland remaining cropland could thus be estimated in the next inventory. An assessment could be made as to how to extrapolate AD from insured cropland to the total area of cropland. However, as discussed with the Party during the review, this extrapolation could produce significant errors. The ERT commends Spain for its continuous efforts to improve its inventory. The ERT recommends that Spain implement the improved AD for wildfires occurring on cropland remaining cropland obtained from the State Agency of Agricultural Insurance for the calculation of CH_4 and N_2O emissions from these lands and report the estimated CH_4 and N_2O emissions in the annual submission, while carefully considering the potential for overestimation of emissions if the emissions from insured cropland are extrapolated to the total cropland area in the country.	Yes. Completeness
L.15	4 (V) Biomass burning – CO_2	The ERT noted that Spain reported CO_2 emissions from controlled biomass burning as "NE" under land converted to cropland in CRF table 4(V) but did not find an explanation in the NIR or the CRF tables as to why these emissions were not estimated. During the review and in response to the draft version of this report, the Party clarified that prescribed or controlled burning is only used to reduce the amount of combustible material, not for land-use change, and further noted that controlled burning could be carried out on land converted to cropland. In the light of this information, the ERT considers that if controlled burning is occasionally carried out	Yes. Completeness

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and or a problem? If yes, classify by type
		on forest land converted to cropland, these emissions need to be reported unless the Party can demonstrate that they can be considered insignificant as defined in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. The ERT recommends that Spain either report CO_2 emissions from controlled biomass burning on land converted to cropland or justify the use of the notation key "NE" if emissions can be considered insignificant as defined in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines and document that in the NIR accordingly.	
L.16	4.C Harvested wood products – CO_2	The ERT noted that CO_2 emissions from biomass (26.47 Mt in 2015) are reported as an information item under the energy sector in CRF table 1. According to the UNFCCC Annex I inventory reporting guidelines, Parties are required to report these emissions under the LULUCF sector if the biomass is harvested at an unsustainable rate (as per footnote 1 to CRF table 1s2). The ERT found no explanation in the NIR as to whether estimates provided in CRF table 4.G include emissions from biomass burning (e.g. under roundwood). During the review, Spain explained that its forests are considered underexploited and are harvested at rates that are not considered to be unsustainable. The Party shared graphs and tables in support of this explanation, and the ERT considered the explanation adequate. The ERT recommends that Spain include in the NIR graphs and/or tables that show that the harvest rate of biomass used as fuel in Spain can be assumed to be sustainable and, therefore, resulting CO_2 emissions do not need to be reported under the LULUCF sector.	Yes. Transparency
Waste			
W.12	5. General (waste)	The ERT noted a lack of transparency in the reporting of emissions from waste incineration with recovery for energy purposes, which are included in the energy sector. In the waste chapter of the NIR, there is no information about emissions from energy recovery activities included in category 1.A.1.a. During the review, Spain acknowledged this lack of transparency and agreed with the ERT's suggestion to enhance the description in the NIR by clearly referring in the waste sector to CO_2, CH_4 and N_2O emissions from incineration included in the energy sector. The ERT recommends that Spain clearly refer in the waste chapter of the NIR to the quantity of CO_2, CH_4 and N_2O emissions from waste incineration with recovery for energy purposes that are included in the energy sector.	Yes. Transparency
W.13	5.D Wastewater treatment and discharge – CH_4 and N_2O	The ERT noted that, in the wastewater and discharge chapter of the NIR, information from domestic wastewater and industrial wastewater is mixed; for example, AD for industrial and domestic wastewater are presented in section 7.4.1. and the methodology used to calculate emissions from both categories is presented in section 7.4.2. This generates confusion in the report. During the review, Spain acknowledged that the wastewater and discharge chapter contains a mix of information on domestic and industrial sources, and agreed to improve this chapter in the	Not an issue/problem

ID[a]	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and or a problem[c]? If yes, classify by type
		next submission. The ERT encourages Spain to separate information presented in the NIR for industrial wastewater from that on domestic wastewater in order to increase the transparency of reporting.	
KP-LULUCF			
KL.11	General (KP-LULUCF)	In the NIR (section 11.5.2.7) Spain mentioned an assessment being carried out on HWP allocation. During the review, the Party stated that it has contracted a national expert to consult on LULUCF issues and that the improvement of HWP estimations is within the scope of the contract. Results in the form of recommendations for improvements to the inventory are expected in October 2017, after which Spain will assess them with the intention to implement them, to the extent possible, in the 2018 annual submission. The ERT commends the Party for its continuous efforts to improve its inventory. The ERT encourages Spain to implement and/or report on progress in the implementation of the planned improvements of sectoral estimates from the work of the national expert on LULUCF issues in the NIR.	Not a problem
KL.12	Cropland management – CO_2	The ERT noted that while Spain reported areas of organic soils in cropland as "NO" in CRF table 4(KP-I)B.2, the NIR (section 6.3.4.2.3) states that 0.04 per cent of the soils in the country are considered organic. During the review, the Party expressed its opinion that areas of organic soils in cropland have low relevance to the overall emission estimates. The ERT enquired about the possibility of assessing whether these potential emissions can be considered insignificant as defined in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. In response, Spain prepared and provided to the ERT a table with rough estimates prepared using the relevant tier 1 method and default EFs from the 2006 IPCC Guidelines; these estimates are below the significance threshold. The ERT recommends that Spain either estimate and report emissions from organic soils in cropland or report them as "NE" while clearly showing in the NIR that emissions associated with this source can be considered insignificant as defined in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Yes. Transparency
KL.13	Biomass burning – CO_2	The ERT noted that Spain reported CO_2 emissions from controlled biomass burning as "NE" under deforestation in CRF table 4(KP-II)4 but did not find an explanation in the NIR or the CRF tables as to why these emissions were not estimated. During the review and in response to the draft version of this report, the Party clarified that prescribed or controlled burning is only used to reduce the amount of combustible material, not for land-use change, and further noted that controlled burning could be carried out on land deforested for cropland. In the light of this information, the ERT considers that if controlled burning is occasionally carried out on deforested lands, these emissions need to be reported unless the Party can demonstrate that they can be considered insignificant as defined in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. The ERT recommends that Spain either report CO_2 emissions from controlled biomass burning under deforestation in CRF table 4(KP-II)4 or justify the use of the notation key "NE" if emissions can be considered	Yes. Completeness

ID[a]	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and or a problem[a] If yes, classify by type
		insignificant as defined in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines and document this in the NIR accordingly.	

[a] Recommendations made by the ERT during the review are related to issues as defined in paragraph 81 of the UNFCCC review guidelines, or problems as defined in paragraph 69 of the Article 8 review guidelines. Encouragements are made to the Party to address all findings not related to such issues or problems.

VI. Application of adjustments

10. The ERT has not identified the need to apply any adjustments to the 2017 annual submission of Spain.

VII. Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol

11. Spain has elected commitment period accounting and therefore the issuance and cancellation of units for KP-LULUCF activities is not applicable for the 2017 review.

VIII. Questions of implementation

12. No questions of implementation were identified by the ERT during the review.

Annex I

Overview of greenhouse gas emissions and removals for Spain for submission year 2017 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as submitted by Spain

1. Tables 6–9 provide an overview of total GHG emissions and removals as submitted by Spain.

Table 6
Total greenhouse gas emissions for Spain, base year[a]–2015
(kt CO_2 eq)

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions including indirect CO_2 emissions*[b]		*Land-use change (Article 3.7 bis as contained in the Doha Amendment)*[c]	*KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)*[d]	*KP-LULUCF activities (Article 3.4 of the Kyoto Protocol)*	
	Total including LULUCF	*Total excluding LULUCF*	*Total including LULUCF*	*Total excluding LULUCF*			*CM, GM, RV, WDR*	*FM*
FMRL								–23 100.00
Base year	265 445.23	290 588.96	NA	NA	NA		–1 098.17	
1990	262 684.41	287 828.14	NA	NA				
1995	301 331.44	327 884.51	NA	NA[c]				
2000	348 018.19	385 587.69	NA	NA				
2010	318 327.95	356 761.43	NA	NA				
2011	320 069.18	356 950.74	NA	NA				
2012	317 673.47	351 817.37	NA	NA				
2013	286 432.14	322 873.54	NA	NA		–12 184.71	642.08	–24 743.30
2014	284 839.49	324 214.82	NA	NA		–11 682.26	–1 808.82	–25 830.99
2015	296 889.66	335 661.52	NA	NA		–10 856.63	–1 996.88	–26 092.38

Note: Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions.

[a] Base year refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs, SF_6 and NF_3. The base year for CM under Article 3, paragraph 4, of the Kyoto Protocol is 1990 for Spain. For activities under Article 3, paragraph 3, of the Kyoto Protocol and FM under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] The Party has not reported indirect CO_2 emissions in CRF table 6.

[c] The value reported in this column refers to 1990.

[d] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely AR, and deforestation.

Table 7
Greenhouse gas emissions by gas for Spain, excluding land use, land-use change and forestry, 1990–2015
(kt CO_2 eq)

	CO_2[a]	CH_4	N_2O	HFCs	PFCs	*Unspecified mix of HFCs and PFCs*	SF_6	NF_3
1990	231 309.75	35 168.64	17 081.85	3 039.92	1 164.38	NA, NO	63.61	NA, NO
1995	267 284.70	37 296.25	16 274.83	5 872.42	1 055.37	NA, NO	100.93	NA, NO
2000	311 933.70	41 585.31	19 720.69	11 664.19	496.12	NA, NO	187.68	NA, NO
2010	284 366.51	39 225.92	15 894.54	16 932.26	107.33	NA, NO	234.87	NO, NE, NA
2011	284 558.03	39 717.57	15 100.07	17 243.68	92.24	NA, NO	239.15	NO, NE, NA
2012	280 502.46	38 902.66	14 688.99	17 446.63	56.64	NA, NO	219.99	NO, NE, NA
2013	252 899.99	37 922.43	15 259.17	16 508.81	69.28	NA, NO	213.85	NA, NO
2014	254 637.29	37 482.42	15 986.24	15 834.29	64.60	NA, NO	209.99	NA, NO
2015	271 725.57	38 352.34	16 108.49	9 164.91	88.46	NA, NO	221.75	NO, NA
Per cent change 1990–2015	**17.5**	**9.1**	**–5.7**	**201.5**	**–92.4**	**NA**	**248.6**	**NA**

Note: Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions.
[a] Spain did not report indirect CO_2 emissions in CRF table 6.

Table 8
Greenhouse gas emissions by sector for Spain, 1990–2015
(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	213 254.10	29 994.07	34 755.16	–25 143.73	9 824.80	NA
1995	250 092.61	32 207.93	34 022.03	–26 553.07	11 561.94	NA
2000	290 693.88	41 911.24	39 998.80	–37 569.50	12 983.77	NA
2010	266 783.41	40 817.10	34 712.01	–38 433.47	14 448.90	NA
2011	268 962.45	38 723.83	34 236.16	–36 881.56	15 028.30	NA
2012	266 817.79	36 949.03	33 113.70	–34 143.90	14 936.85	NA
2013	240 436.13	34 566.83	33 373.32	–36 441.40	14 497.26	NA
2014	239 550.83	36 183.92	34 899.25	–39 375.34	13 580.82	NA

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
2015	255 452.61	30 759.67	35 978.59	–38 771.85	13 470.65	NA
Per cent change 1990–2015	**19.8**	**2.6**	**3.5**	**54.2**	**37.1**	**NA**

Notes: (1) Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions; (2) Spain did not report indirect CO_2 emissions in CRF table 6.

Table 9

Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year[a]–2015, for Spain

($kt\ CO_2\ eq$)

	Article 3.7 bis as contained in the Doha Amendment[b]	*Article 3.3 of the Kyoto Protocol*		*FM and elected Article 3.4 activities of the Kyoto Protocol*				
	Land-use change	*AR*	*Deforestation*	*FM*	*CM*	*GM*	*RV*	*WDR*
FMRL				–23 100.00				
Technical correction				NO				
Base year	NA				–1 098.17	NA	NA	NA
2013		–12 754.25	569.54	–24 743.30	642.08	NA	NA	NA
2014		–12 245.27	563.01	–25 830.99	–1 808.82	NA	NA	NA
2015		–11 419.13	562.50	–26 092.38	–1 996.88	NA	NA	NA
Per cent change base year–2015					**81.8**	**NA**	**NA**	**NA**

Note: Values in this table include emissions on lands subject to natural disturbances, if applicable.

[a] The base year for CM under Article 3, paragraph 4, of the Kyoto Protocol is 1990 for Spain. For activities under Article 3, paragraph 3, of the Kyoto Protocol, and FM under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] The value reported in this column refers to 1990.

2. Table 10 provides an overview of relevant key data for Spain's reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 10
Key relevant data for Spain under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Key parameters	*Values*
Periodicity of accounting	(a) AR: commitment period accounting
	(b) Deforestation: commitment period accounting
	(c) FM: commitment period accounting
	(d) CM: commitment period accounting
	(e) GM: not elected
	(f) RV: not elected
	(g) WDR: not elected
Election of activities under Article 3, paragraph 4	CM
Election of application of provisions for natural disturbances	Yes, for AR and FM
3.5% of total base-year GHG emissions, excluding LULUCF	9 917.659 kt CO_2 eq (79 341.275 kt CO_2 eq for the duration of the commitment period)
Cancellation of AAUs, ERUs, CERs and/or issuance of RMUs in the national registry for:	
1. AR in 2015	NA
2. Deforestation in 2015	NA
3. FM in 2015	NA
4. CM in 2015	NA
5. GM in 2015	NA
6. RV in 2015	NA
7. WDR in 2015	NA

Annex II

Information to be included in the compilation and accounting database

Tables 11–13 include the information to be included in the compilation and accounting database for Spain. Data shown are from the original annual submission of the Party, including the latest revised estimates submitted, adjustments (if applicable), as well as the final data to be included in the compilation and accounting database.

Table 11
Information to be included in the compilation and accounting database for 2015, including on the commitment period reserve, for Spain
($t CO_2 eq$)

	Original submission	*Revised estimates*	*Adjustment*	*Final*
CPR	1 590 189 509			1 590 189 509
Annex A emissions for 2015				
CO_2	271 725 566			271 725 566
CH_4	38 352 338			38 352 338
N_2O	16 108 494			16 108 494
HFCs	9 164 907			9 164 907
PFCs	88 462			88 462
Unspecified mix of HFCs and PFCs	NO, NA			NO, NA
SF_6	221 749			221 749
NF_3	NO, NA			NO, NA
Total Annex A sources	**335 661 517**			**335 661 517**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2015				
3.3 AR	–11 419 127			–11 419 127
3.3 Deforestation	562 500			562 500
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2015				
3.4 FM	–26 092 385			–26 092 385
3.4 CM	–1 996 876			–1 996 876
3.4 CM for the base year	–1 098 167			–1 098 167

Table 12
Information to be included in the compilation and accounting database for 2014, for Spain
($t CO_2 eq$)

	Original submission	*Revised estimates*	*Adjustment*	*Final*
Annex A emissions for 2014				
CO_2	254 637 285			254 637 285
CH_4	37 482 419			37 482 419
N_2O	15 986 244			15 986 244
HFCs	15 834 286			15 834 286
PFCs	64 598			64 598
Unspecified mix of HFCs and PFCs	NA, NO			NA, NO
SF_6	209 988			209 988
NF_3	NA, NO			NA, NO
Total Annex A sources	**324 214 822**			**324 214 822**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014				
3.3 AR	–12 245 271			–12 245 271
3.3 Deforestation	563 008			563 008
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014				
3.4 FM	–25 830 989			–25 830 989
3.4 CM	–1 808 818			–1 808 818
3.4 CM for the base year	–1 098 167			–1 098 167

Table 13
Information to be included in the compilation and accounting database for 2013, for Spain
($t CO_2 eq$)

	Original submission	*Revised estimates*	*Adjustment*	*Final*
Annex A emissions for 2013				
CO_2	252 899 988			252 899 988
CH_4	37 922 432			37 922 432
N_2O	15 259 170			15 259 170
HFCs	16 508 815			16 508 815
PFCs	69 283			69 283
Unspecified mix of HFCs and PFCs	NA, NO			NA, NO
SF_6	213 851			213 851
NF_3	NA, NO			NA, NO
Total Annex A sources	**322 873 538**			**322 873 538**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013				
3.3 AR	–12 754 246			–12 754 246
3.3 Deforestation	569 536			569 536
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013				
3.4 FM	–24 743 303			–24 743 303
3.4 CM	642 078			642 078
3.4 CM for the base year	–1 098 167			–1 098 167

Annex III

Additional information to support findings in table 2

Missing categories that may affect completeness

The categories for which methods are included in the 2006 IPCC Guidelines that were reported as "NE" or for which the ERT otherwise determined that there may be an issue with the completeness of reporting in the Party's inventory are the following:

(a) 4.C.1 Carbon stock changes in the soil pool under grassland remaining grassland (see ID# L.11 in table 5);

(b) 4(V) Biomass burning – CO_2 emissions from biomass burning on cropland remaining cropland and grassland remaining grassland (see ID# L.13 in table 5);

(c) 4(V) Biomass burning – CH_4 and N_2O emissions from wildfires on cropland remaining cropland (see ID# L.14 in table 5);

(d) 4(V) Biomass burning – CO_2 emissions from controlled burning on land converted to cropland (see ID# L.15 in table 5);

(e) 4(KP-II)4 Biomass burning – CO_2 emissions from controlled burning under deforestation (see ID# KL.13 in table 5).

Annex IV

Documents and information used during the review

A. Reference documents

Reports of the Intergovernmental Panel on Climate Change

IPCC. 2003. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. J Penman, M Gytarsky, T Hiraishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html.

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html.

IPCC. 2014a. *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/kpsg.

IPCC. 2014b. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Available at http://www.ipcc-nggip.iges.or.jp/public/wetlands/index.html.

Annual review reports

Reports on the individual review of the 2013, 2014, 2015 and 2016 annual submissions of Spain contained in documents FCCC/ARR/2014/ESP, FCCC/ARR/2015/ESP, FCCC/ARR/2016/ESP and FCCC/ARR/2017/ESP, respectively.

Other

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at http://unfccc.int/resource/webdocs/agi/2017.pdf.

Annual status report for Spain for 2017. Available at http://unfccc.int/resource/docs/2017/asr/esp.pdf.

EEA. 2013. *EMEP/EEA air pollution emission inventory guidebook 2013*. Available at www.eea.europa.eu/publications/emep-eea-guidebook-2013.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Fernandez Diez-Picazo (Inventories Unit, Ministry of Agriculture and Fisheries, Food and Environment), including additional material on the methodology and assumptions used. The following documents[1] were also provided by Spain:

AITEMIN Centro Tecnológico. 2014. *Estimación de las emisiones de gases de efecto invernadero procedentes de las minas abandonadas en España y desarrollo de una mejora metodológica en la estimación de las mismas en el Inventario Nacional de emisiones* (Estimation of greenhouse gas emissions from abandoned mines in Spain and development of a methodological improvement in the estimation of these emissions in the National Emissions Inventory).

AITEMIN Centro Tecnológico. 2015. *Revisión de las estimaciones de las emisiones de gases de efecto invernadero procedentes de las minas en España* (Revision of the estimates of greenhouse gas emissions from mines in Spain).

[1] Reproduced as received from the Party.

APPLUS NORCONTROL. Plan piloto de caracterización de residuos urbanos de origen domiciliario. Madrid: MAGRAMA, 2012.

Boletín Oficial Del Estado. 30 de junio de 2015. *Contratación del Sector Público. Ministerio De Agricultura, Alimentación Y Medio Ambiente. 20918 – Resolución de la Dirección General de Calidad y Evaluación Ambiental y Medio Natural por la que se convoca licitación pública para la contratación del expediente 15CASV008. Servicio a la Dirección General de Calidad y Evaluación Ambiental y Medio Natural para auditoría externa de calidad (QA) del Sistema Español de Inventario y planteamiento de planes de mejora* (Contracting the Public Sector. Ministry Of Agriculture, Food And Environment. 20918 - Resolution of the General Directorate of Quality and Environmental Evaluation and Natural Environment, which calls for public tender for the contracting of the file 15CASV008. Service to the General Directorate of Quality and Environmental Assessment and Natural Environment for quality external audit (QA) of the Spanish Inventory System and planning of improvement plans). Madrid.

Grupo Tragsa. 2017. *Detalle de licitación TEC0004769 | Tragsa. 2017. Servicio de auditoria externa de garantía de calidad (QA) del Sistema Español de Inventario correspondiente a los años de reporte 2018, 2019, 2020 y 2021* (Tender detail TEC0004769 | Tragsa. 2017. External quality assurance (QA) audit service of the Spanish Inventory System corresponding to the reporting years 2018, 2019, 2020 and 2021). Madrid.

Maria Luz Cayuela et al. 2017. *Direct Nitrous oxide emissions in Mediterranean climate cropping systems: Emissions factor based on a meta-analysis of available measurement data.* Agriculture, Ecosystems & Environment, Volume 238, 1 February 2017, Pages 25-35 http://www.sciencedirect.com/science/article/pii/S0167880916304984.

Ministerio de Medio Ambiente. 2007. *Acuerdo por el que se estabelecen los mecanismos de obtención de información para la aplicación en España del sistema de inventario nacional de emisiones contaminantes a la atmosfera* (Agreement establishing the mechanisms for obtaining information for the application in Spain of the system of national inventory of pollutant emissions to the atmosphere). Madrid.

Ministerio de Agricultura, Alimentación y Medio Ambiente. 2015. *Bases zootécnicas para el equilibrio alimentario de fosforo y nitrogeno en caballos (*Zootecnicas bases for the alimentary balance of phosphorus and nitrogen in horses). Madrid. http://www.mapama.gob.es/imagenes/es/balancealimentarioequidos_tcm7-413695.pdf.

Ministerio de Agricultura, Alimentación y Medio Ambiente. 2016. *Bases zootécnicas para el equilibrio alimentario de fosforo y nitrogeno en aves de cerdos (*Zootecnicas bases for the alimentary balance of phosphorus and nitrogen in swine). Madrid.

Ministerio de Agricultura, Alimentación y Medio Ambiente. 2017. *Bases zootécnicas para el equilibrio alimentario de fosforo y nitrogeno en aves de Corral Carne (*Zootecnicas bases for the alimentary balance of phosphorus and nitrogen in poultry meat). Madrid.

Ministerio de Agricultura, Alimentación y Medio Ambiente. 2017. *Bases zootécnicas para el equilibrio alimentario de fosforo y nitrogeno en aves de Corral Postura) (*Zootecnicas bases for the alimentary balance of phosphorus and nitrogen in poultry laying). Madrid.

Ministerio de Agricultura, Alimentación y Medio Ambiente. 2017. *Bases zootécnicas para el equilibrio alimentario de fosforo y nitrogeno en ovejas (*Zootecnicas bases for the alimentary balance of phosphorus and nitrogen in sheep). Madrid.

Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente. 2017. *Anuario de Estadística Forestal 2013*. Madrid. Available at: http://www.mapama.gob.es/es/desarrollo-rural/estadisticas/forestal_anuario_2013.aspx.

Ministerio de Agricultura, Alimentación y Medio Ambiente. 2013. *Cuarto Inventario Forestal Nacional, Comunidad Autónoma del País Vasco / Euskadi*. Madrid. Available at: http://www.euskadi.eus/contenidos/informacion/inventario_forestal_2011/es_agripes/adjuntos/IFN4_PAIS_VASCO.pdf.